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August 21, 2015

Ms. Shari Lynn Kolak Remedial Project Manager Superfund Division U.S. Environmental Protection Agency, Region 5-77 West Jackson Boulevard, SRF-5J Chicago, IL 60604-3590

Re: Transmittal, Revised RI/FS Work Plan

Operable Unit 2, Lake Calumet Cluster Site, Chicago, Illinois

Dear Ms. Kolak:

Enclosed for your review is the revised Operable Unit 2 (OU2) Remedial Investigation and Feasibility Study (RI/FS) Work Plan for the Lake Calumet Cluster Site in Chicago, Illinois. This Work Plan has been prepared in accordance with the Administrative Settlement Agreement and Order on Consent and Section 1.2 of the accompanying Statement of Work. It has been revised from the version submitted on December 17, 2012 in response to comments received from the U.S. Environmental Protection Agency (USEPA). Two hard copies and one electronic copy on compact disc (CD) are being submitted to USEPA and to the Illinois Environmental Protection Agency (IEPA).

Also enclosed is a summary of the responses to the USEPA comments on the OU2 RI/FS Work Plan that were presented in USEPA's letter of July 6, 2015.

We trust that this submittal satisfies your requirements at this time. If you have questions, please do not hesitate to contact me.

Respectfully submitted,

Leo M. Brausch Project Coordinator

LMB: Enclosures Ms. Shari Lynn Kolak August 20, 2015 Page 2

cc: P. Lake, IEPA (two hard copies plus one electronic copy on CD)

cc (transmittal letter and response to comments only, via email):

- S. M. Franzetti, Esq.
- J. Kratzmeyer, ARCADIS
- LCCS Technical Committee

Responses to U.S. Environmental Protection Agency Comments Remedial Investigation/Feasibility Study Work Plan Operable Unit 2 Lake Calumet Cluster Site, Chicago, Illinois

Following are responses to certain comments from the U.S. Environmental Protection Agency (USEPA) regarding the Remedial Investigation and Feasibility Study (RI/FS) Work Plan for Operable Unit 2 (OU2) of the Lake Calumet Cluster Site (LCCS or the "Site"). More specifically, this document responds to the comments presented in USEPA's letter of July 6, 2015 and references pertinent sections of the Work Plan that were revised to address these comments.

On behalf of the LCCS Group (the "Group"), ARCADIS, U.S., Inc. (ARCADIS) had prepared and submitted the OU2 RI/FS Work Plan on December 17, 2012. USEPA comments on the Work Plan were provided via letter dated February 11, 2015. The Group discussed these comments with USEPA and Illinois Environmental Protection Agency (IEPA) representatives in conference calls on March 26 and April 16, 2015, and, based on those discussions, the Group submitted a response-to-comment document to USEPA on May 7, 2015. USEPA further commented on the response-to-comment document in draft form on July 1, 2015 and discussed their concerns with IEPA and the Group via conference call on July 2, 2015. Final comments on the response-to-comments were provided via USEPA letter dated July 6, 2015. ARCADIS has revised the OU2 RI/FS Work Plan consistent with the current and previously accepted responses and is resubmitting the Work Plan to USEPA.

The individual comments are shown below followed by the Group's response in *italicized* type. Comment numbers are those referenced in the July 6, 2015 letter. Only responses to comments in the July 6, 2015 letter are included in this document; comments not listed have been resolved by previously agreed-to changes in the Work Plan.

2. Response not accepted. In regard to the United States Army Corp of Engineers (USACE) toxicity testing, see EPA comment #17. Also, surface water and sediments in Indian Ridge Marsh (IRM) adjacent to the Site have not been fully characterized. Only one surface water and sediment sample (SW-20/SED-20), collected in 1999 from the interior of IRM, was analyzed for the full suite of parameters (VOCs, SVOCs, PAH, metals, PCBs). Although surface water samples (SW-06, SW-07, and SW-09) were collected from the interior of IRM, these samples were only analyzed for metals and two organic compounds. The most recent (2009) surface water samples (SW-08 through SW-10) from the interior of IRM were only analyzed for ammonia and metals. Corresponding sediment samples (SD-08 through SD-10) were submitted for Simultaneously Extracted Metals/Acid Volatile Sulfides analysis for bioassay (toxicity) testing, and not for characterization purposes.

Without full characterization of IRM, Chemicals of Potential Concern in IRM surface water and sediments cannot be identified therefore, potential risks to human health and ecological receptors cannot be evaluated. For purposes of conducting the Baseline

Human Health Risk Assessment (BHHRA) and the Ecological Risk Assessment (ERA) (if warranted), additional characterization of IRM may be needed. EPA understands this potential data gap will be addressed in subsequent phases of the RI. In regard to the United States Army Corp of Engineers (USACE) toxicity testing, see EPA comment #17.

As indicated in Section 1 and elsewhere in the OU2 RI/FS Work Plan, the need to collect further data regarding surface water, sediments, and biota in Indian Ridge Marsh will be evaluated after completing the groundwater characterization activities described in this Work Plan. Based on the scope of the LCCS OU2 RI as defined in SOW, impacts to Indian Ridge Marsh come into play for the OU2 RI and risk assessments only to the extent that groundwater currently emanating from the LCCS is affecting the marsh. Beyond this limitation, further characterization of the marsh or other evaluations of historical impacts would be addressed as a third Operable Unit for the LCCS.

5. Response accepted. See EPA comment #2.

No further discussion necessary.

7. Response accepted. See EPA comments #2 and #17.

No further discussion necessary.

10. Response accepted. Well construction diagrams and boring logs for wells on Paxton I and II property can be obtained through Illinois EPA Freedom of Information Act process. EPA does not have this information in its possession.

No further discussion necessary.

12. Response not accepted. During the March 26, 2015 conference call, EPA and IEPA did not agree to not characterize water within fill or waste. During the call, the Agencies agreed not to characterize the source areas until the perimeter sampling data became available. IEPA did acknowledge that the areas beneath the final cap may be able to be granted a "zone of attenuation" where cleanup was not required unless contaminants were migrating beyond the cap boundary.

As described in Section 3 of the OU2 RI/FS Work Plan, initial investigation activities will focus on characterizing groundwater flow direction and characterizing COPC concentrations in groundwater currently emanating from the Site. The expanded network of piezometers and HPT/VAP locations proposed in the current RI/FS Work Plan (see the current Figure 7, relative to the version included in the 2012 RI/FS Work Plan) will provide for identification of areas of groundwater impact emanating from the heterogeneous waste and fill materials at the site. After completion of the scope identified in the RI/FS Work Plan, the need for further investigation of any groundwater COPC source areas will be evaluated.

13. Response not accepted. Because groundwater has not yet been "classified" under Illinois regulations, 35 IAC Part 620, it is not known whether groundwater could be used in the future as a potable water supply (regardless of whether a groundwater ordinance is in place). Therefore, all historic groundwater data needs to be compared to federal and state groundwater standards identified in EPA's original comment (MCLs, Tapwater Regional Screening Levels (RSLs), Illinois' Groundwater Quality Standards under 35 IAC Part 620, and Illinois' General Use and Secondary Contact Water Quality Standards (35 IAC 302.208, 302.210 and 302.407) for the protection of human health. If the Agencies agree that the groundwater is Class II Groundwater and the Illinois' Surface Water Quality Standards. In regard to using Calumet Open Space Reserve (COSR) benchmarks, see EPA comment #17.

Section 2.6 of the OU2 RI/FS Work Plan is intended to summarize information from previous studies regarding groundwater impacts. Based on spatial locations of the wells from which these data were collected and the age of these data, the currently available information may not be representative of current Site conditions, and extensive comparisons to various potentially relevant criteria are of limited value. Data generated in the course of the OU2 RI will be compared to the appropriate standards and benchmarks as described in Sections 4.2.1.1 and 5.2.1 of the OU2 RI/FS Work Plan.

17. Response not accepted. For the reasons stated in EPA comment #13, groundwater also needs to be compared to MCLs, Tapwater and Illinois' General Use and Secondary Contact Water Quality Standards (35 IAC 302.208, 302.210, and 302.407) for the protection of human health in the BHHRA. For the ERA, groundwater potentially venting to surface water also need to be compared to Region 5 Ecological Screening Levels, Great Lakes Water Quality Initiative methodologies, and Illinois' acute and chronic General Use and Secondary Contact Water Quality Standards (35 IAC 302.208, 302.210 and 302.407) for the protection of aquatic receptors.

In regard to using COSR benchmarks for comparing groundwater discharge to surface water in IRM, COSR benchmarks were derived by the USACE for restoration purposes rather than for remediation under the Superfund program, using sediment samples that may not be representative in location nor temporally with current conditions in IRM adjacent to the Site. Four sediment samples (SD-01, SD-02, SD-03, and SD-05) were used for bioassay analysis. Only one sediment sample (SD-05) was collected from IRM along the eastern perimeter adjacent to the Site. No sediment samples from the interior of IRM (areas of likely contamination) were used for toxicity testing. One sample from the eastern perimeter of Site may not be representative of conditions in interior of IRM.

Also, vegetative samples (VG-01 through VG-04) were collected from locations within IRM-North and/or IRM-South. No vegetative samples were collected from IRM adjacent to the Site. Samples collected from IRM-North and IRM-South may not be representative of conditions in IRM adjacent to Site therefore USACE's conclusion that metals are not significantly accumulating in vegetation may not be valid.

Data generated in the course of the OU2 RI will be compared to the appropriate standards and benchmarks as described in Sections 4.2.1.1 and 5.2.1 of the OU2 RI/FS Work Plan. As indicated in Section 1 and elsewhere in the OU2 RI/FS Work Plan, the need to collect further data regarding surface water, sediments, and biota in Indian Ridge Marsh will be evaluated after completing the groundwater characterization activities described in this Work Plan.

Further, contamination levels may have increased over the past 6 years since 2009, as Site contamination releases have likely continued to occur. If benchmark values are developed from site-specific toxicity testing, sediment samples need to be representative of current IRM conditions adjacent the Site. Also, toxicity testing should be conducted with two or more benthic or epibenthic species representing diverse taxa and life strategies (e.g., amphipods and midge fly larvae).

Section 2.7.2 describes the work done at Indian Ridge Marsh from a historical perspective and is not intended to provide benchmark comparisons for the purposes of the RI. As described in Section 1, the need to collect further data regarding surface water, sediments, and biota in Indian Ridge Marsh will be evaluated after completing the groundwater characterization activities described in this Work Plan. In the event that toxicity testing is determined to be appropriate and necessary, two or more benthic or epibenthic species representing diverse taxa and life strategies (e.g., amphipods and midge fly larvae) will be used.

The conjecture that contamination levels may have increased over the past 6 years since 2009 is totally without basis and contrary to all available Site information.

20. Response accepted. Although the Site covers 60 acres, aerial photography exists that show several acres of above groundwater waste management activities. These areas are logical places to place groundwater monitoring wells to determine what types of contaminate concentration gradients exist. Sampling along the perimeter only will not yield source concentration data which is vital for determining potential remedial actions for the groundwater. EPA agrees only to defer additional sampling in the interior of the Site until after the initial phases of the field investigation have been completed so that the results may help inform where interior sampling should occur. EPA reserves the right to request further characterization of source areas during subsequent phases of the RI.

No further discussion necessary at this time.

22. Response accepted, but EPA reserves the right to request additional investigations as part of future phases of the RI.

No further discussion necessary at this time.

25. Response accepted.

No further discussion necessary.

30. Response accepted, but EPA reserves the right to request additional Hydraulic Profiling Tool work during future phases of the RI.

No further response necessary at this time. The need for interior characterization will be evaluated based on initial data collection as described in the response to Comment 20.

34. Response accepted, but EPA reserves the right to request additional sampling whether it be a Vertical Aquifer Profiling or permanent monitoring wells.

No further discussion necessary at this time.

35. Response accepted.

No further discussion necessary.

39. Response accepted, but EPA reserves the right to increase the number of permanent monitoring wells.

No further discussion necessary at this time.

40. Responds accepted, but EPA reserved the right to request permanent monitoring wells be installed in low permeability strata in the future to verify a lack of contaminant migration both vertically and horizontally.

No further response necessary at this time.

43. Response not accepted. See EPA comment #2 and #7.

See response to Comment 7. The paragraph identified in the original comment has been removed from Section 3.4.1.

46. Response does not address original comment. The statement that existing surface water and sediment data for IRM provide adequate characterization for the BHHRA and ERA should be removed from page 26 of OU2 RI/FS Work Plan. See EPA comment #2.

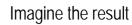
The statement has been removed from Section 3.4.1.

51. Response accepted. Please reference the document under footnote #8 in the OU2 RI/FS Work Plan.

The document is referenced in Section 5.2.

52. Response not accepted. See EPA comment #13 and #17.

See responses to Comments 13 and 17.





Lake Calumet Cluster Site Group

RI/FS Work Plan Operable Unit Two

Lake Calumet Cluster Site Chicago, Illinois

August 2015



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RI/FS Work Plan **Operable Unit Two**

Lake Calumet Cluster Site Chicago, Illinois

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August 21, 2015

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1. Introduction

Remedial activities at the Lake Calumet Cluster Site (Site) include two operable units. Operable Unit One provides for source control and addresses on-site soils and waste materials, and Operable Unit Two focuses exclusively on groundwater entering the Site, at the Site, and emanating from the Site. As indicated in the Operable Unit One Record of Decision (ROD) (Illinois Environmental Protection Agency [IEPA 1996]), any remedial action for areas outside the source area (e.g., Indian Ridge Marsh) would be addressed in a third operable unit.

This Remedial Investigation/Feasibility Study Work Plan (RI/FS Work Plan) is for Operable Unit Two and has been prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Lake Calumet Cluster Site Group (LCCS Group). The RI/FS Work Plan describes the work that will be performed by the LCCS Group under the 2013 Administrative Settlement Agreement and Order on Consent (Settlement Agreement) and the accompanying Statement of Work (SOW) for conducting the RI/FS for Operable Unit Two.

Previous soil, surface water, and groundwater sampling at the Site and adjacent areas has been conducted by the United States Environmental Protection Agency (USEPA), the City of Chicago Department of the Environment (CDOE), IEPA, and the U.S. Army Corps of Engineers (USACE). Data from this sampling were obtained in accordance with standard data quality assurance and quality control procedures accepted by or consistent with those employed by the USEPA. In preparing this RI/FS Work Plan, ARCADIS has reviewed the previous Site characterization reports and data and has identified gaps in the current understanding of Site groundwater and related conditions. In accordance with the SOW, this RI/FS Work Plan describes additional investigation activities needed to supplement the existing Site data to characterize the nature and extent of contamination in groundwater entering the Site, at the Site, and emanating from the Site, evaluate potential human health and ecological risks associated with exposure to groundwater, and perform a Feasibility Study focused on the requirements

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¹ ARCADIS completed a Level IV validation of the 2009 sediment and surface water sampling data collected by the USACE from Indian Ridge Marsh (**Appendix A**). This data validation indicated that the USACE data are usable as Level IV data.



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for remedial action to address groundwater impacts, to the extent remediation is required to meet remedial action objectives (RAOs).

As described further in this Work Plan, the need to collect further data regarding surface water, sediments, and biota in Indian Ridge Marsh will be evaluated after completing the groundwater characterization activities described in this Work Plan. The RI/FS Work Plan has been organized into ten sections. A brief description of each of the sections is provided below:

<u>Section 1.0 – Introduction</u>. The introduction addresses the purpose of the RI/FS Work Plan and the RI/FS Work Plan organization. The introduction also addresses expected community relations support activities.

<u>Section 2.0 – Background</u>. The background section describes the location, land use, and physical setting of the Site. This section also provides a brief summary of historical operations and removal actions, results of groundwater monitoring, and remaining groundwater data gaps.

<u>Section 3.0 – Site Characterization Tasks</u>. This section describes the remedial investigation (RI) tasks to be completed, including installation of piezometers and monitoring wells, additional subsurface characterization activities, and groundwater sampling and analysis.

<u>Section 4.0 – Baseline Human Health Risk Assessment</u>. This section describes the development of the baseline human health risk assessment, which will be completed based on available and RI-developed data. The baseline human health risk assessment will be incorporated into the RI Report.

<u>Section 5.0 – Baseline Ecological Risk Assessment</u>. This section describes the development of the baseline ecological risk assessment, which will be completed based on available and, if needed, additional data developed as part of the RI or ecological risk assessment process. The baseline ecological risk assessment will be incorporated into the RI Report.

<u>Section 6.0 – Remedial Investigation Report</u>. This section describes the components of the RI Report to be submitted following completion of the Site characterization and risk assessment activities.



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<u>Section 7.0 – Treatability Studies</u>. This section addresses treatability studies that may be necessary.

<u>Section 8.0 – Feasibility Study Report</u>. This section describes the FS Report that will be developed based on the results of the RI and risk assessments.

<u>Section 9.0 – Project Organization and Schedule</u>. This section identifies the key personnel and organizations involved with the RI/FS and provides the proposed schedule for RI/FS activities.

<u>Section 10.0 – References</u>. This section lists documents that have been cited or discussed in this report as well as several of the key USEPA guidance documents for the RI/FS.

This RI/FS Work Plan is a specified deliverable under Task 1 as defined in the SOW. The supporting RI/FS planning documents to be provided under Task 1 are the Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP). The supporting RI/FS planning documents have been submitted under separate cover for USEPA review and approval.

USEPA has the responsibility of developing and implementing community involvement activities for the Site. As requested, the LCCS Group will provide community relations support by providing USEPA information regarding Site history, participating in public meetings, assisting in preparing fact sheets, and similar activities. Such community relations support comprises Task 2 of the SOW.

2. Site Background

This section provides a brief summary of existing Site conditions, previously completed removal actions, and prior Site groundwater investigations. The information presented in this section was primarily obtained through a review of Site-related reports listed in **Section 10**.

2.1 Location and Land Use

The Site is located in a heavily industrialized area in southeastern Chicago, Illinois, southeast of Lake Calumet and approximately two miles northeast of Hegewisch, Illinois (**Figure 1**). The Site consists of an aggregation of four separate parcels (*i.e.*, Alburn Incinerator, U.S. Drum, the Unnamed Parcel, and the Paxton Lagoons). The



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property is bounded to the west by Land and Lakes #3 Landfill, to the northwest by Paxton II Landfill, to the north by Paxton I Landfill, to the east by the Norfolk Southern Railroad right-of-way and Indian Ridge Marsh, and to the south by 122nd Street (**Figure 2**).

2.2 Physical Setting

The Site is generally flat lying with approximately five to ten feet of relief associated with filling activities. The low-lying areas typically contain surface water. An access road to the Paxton I and Paxton II landfills traverses north-south through the Site from 122nd Street. Vegetation on the Site ranges from sparse weeds and grasses, with very poor coverage, to very dense, tall *Phragmites sp.* in the northeastern quadrant. The vegetation at the Site was cleared in 2007 during the initial cap construction activities conducted as part of Operable Unit One. Indian Ridge Marsh is located east of the Site.

2.2.1 Climate

The regional climate is characteristic of the northern mid-continent. Based on data collected by the National Weather Service from 1981 to 2010, the coldest mean monthly temperature is in January (18.2 °F), and the warmest mean monthly temperature is in July (84.2 °F). The mean annual temperature is 59.4 °F. The average annual precipitation is 39.09 inches. The highest rainfall levels occur on average during the three-month period from May through July (12.2 inches total) with slightly lower rainfall amounts occurring during the three months from September through November (9.97 inches total).

2.2.2 Regional Geology

The Site is located within the Chicago/Calumet Lacustrine Plain, a glacially formed, low crescent-shaped flat surface that slopes gently towards Lake Michigan located approximately two miles east of the Site. The Lacustrine Plain is primarily a wave-scoured ground moraine with fine lake silts and clays covering the surface in former back-barrier settings. Prominent depositional features on the Plain are sand and gravelly sand spits, mainland beaches, and beach-ridge/dune complexes. This lowland region drains into Lake Michigan.

The bedrock geology consists of Precambrian-age crystalline rock overlain by gently dipping Paleozoic sedimentary bedrock units. The uppermost bedrock consists of



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eastward gently dipping Silurian dolomite. The bedrock surface topography is an undulating plain as a result of glacial and some lake erosion in which scattered steep valleys and low bedrock hills occur. The bedrock is overlain by approximately 50 to 100 feet of unconsolidated Quaternary-age deposits, which are composed primarily of dark gray, silty clay till overlain by medium- to fine-grained sands. The till deposits are assigned to the Wadsworth Formation of the Wedron Group and the sands are assigned to the Carmi Member of the Equality Formation.

2.2.3 Site Geology

Previously conducted investigations define the sequence of unconsolidated materials above bedrock at the Site. The lowermost unit is composed of gray/brown silty clay with trace fine sand and gravel. Gray silty sand, containing varying percentages of medium- to fine-grained sand with silt exhibiting brown to gray characteristics, overlays the silty clay unit. Fill composed of various solid and household wastes overlays the silty sand unit. A maximum thickness of 23 feet of fill was encountered during monitoring well installation activities at the Site. The solid waste found throughout the Site varied from industrial/demolition debris (e.g., slag, metal pieces, bricks, tires, wood, concrete, cinders, etc.) to household waste (e.g., garbage bags, newspapers, clothing, shoes, rags, etc.). The depths and thicknesses of the units underlying the fill are variable and not well-defined based on the data collected during the previous investigations. A generalized stratigraphic column for the Site is depicted below.



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Generalized Site Stratigraphy

2.2.4 Regional Hydrogeology

The four primary aquifers recognized in the Chicago area are the following:

- Sand and Gravel Aquifers within the Glacial Drift;
- Shallow Bedrock Aquifers, mainly Silurian in age;
- · Cambrian-Ordovician Aquifer; and
- Mt. Simon Aquifer.

The uppermost aquifer system identified in the vicinity of the Site is the Glacial Drift Aquifer within the Sand and Gravel Aquifer, consisting of sands overlaying and interbedded with glacial till.



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2.2.5 Local Hydrogeology

The water table is generally at shallow depths and has been encountered two to four feet below ground surface (bgs) during some Site investigation activities. Some of the groundwater appears to discharge to Indian Ridge Marsh to the east under certain flow conditions (E&E 1999). The degree to which shallow groundwater discharges to Indian Ridge Marsh will be investigated as part of the groundwater characterization activities described in this Work Plan.

Groundwater elevation contours were developed as part of the IEPA groundwater monitoring activities performed in 2002 and by E&E, as a contractor to IEPA, in 2007 (E&E 2007). The IEPA 2002 monitoring event included wells from the Paxton II and Land and Lakes landfills so that a larger number of wells were used to develop groundwater contours in the area surrounding the Site during the 2002 monitoring event. From the 2002 data, groundwater flow direction was shown to be to the east and southeast within the Site boundaries. The more-limited 2007 data showed groundwater flow from the Site to be predominantly to the east. Copies of the E&E 1999, IEPA 2002, and E&E 2007 potentiometric maps are included in **Appendix B**.

The hydraulic gradient estimated from the contour maps ranges from 0.004 feet per foot (ft/ft) (E&E 1999) to 0.007 ft/ft (IEPA 2002a). No hydraulic conductivity tests have been conducted at the Site. The E&E 2007 report indicated vertical hydraulic gradients that ranged from 0.079 to 0.281 ft/ft downward.

2.3 Historical Site Operations and Removal Actions

The Site has a long history of waste disposal activities dating back more than a century, and fill operations in the vicinity of the Site appear to have occurred prior to 1880 (*i.e.*, the date when the original parcel map was drawn). Several documents report that, in the Lake Calumet region, beginning in the early 1900s, nearby industries disposed of slag and other wastes that raised the ground surface to an elevation just above the water table. In describing the Site in its "National Priorities List (NPL) Site Narrative," USEPA states the following

(http://www.epa.gov/superfund/sites/npl/nar1743.htm. Accessed December 5, 2012):

"The site was originally a wetland. Various excavation, filling, and dumping activities occurred from the 1940's to the 1980's. The site is now covered by as much as 30 feet of fill consisting of various materials, including steel mill slag and industrial, chemical, and municipal waste."



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Aerial photographs of the Site area are available from 1938, 1949, 1952, 1955, 1958, 1959, 1960, 1961, 1964, 1967, 1970, 1973, 1975, 1977, 1981, and 1986. These photographs document landfill operations at the Site dating back to around 1950. As described in more detail below, by 1961, landfilling activities had occurred on most portions of the Site.

Historical operations and removal actions at each of the four parcels included in the Site are summarized below.

Alburn Incinerator: The Alburn Incinerator facility (9± acres) was located at 2200 119th Street and was operated as an industrial waste incinerator and storage facility (Agency for Toxic Substances and Disease Registry [ATSDR] 2009). Evidence of operator-specific waste disposal operations is available for the period beginning in about 1958 and continuing to approximately mid-1983.

In the 1950s through approximately 1962, an entity known as the "Southside Landfill" operated in an area that included what later became the area of operations of the Alburn Incinerator, and from approximately 1962 to 1972, the Cal Harbor Landfill conducted waste disposal operations in this portion of the Site. In the 1970s, Earth II began operating on the Alburn Incineration area of the Site (PRC Engineering 1986). A February 1974 IEPA inspection report of the Earth II facility describes its operations as primarily a landfilling operation but notes that some liquid wastes were being received (e.g., waste solvents, waste oils, wastewater) from various industries and further notes that burnable material was being dumped into one of three 8,000 gallon open pits (IEPA 1974).

In January 1975, IEPA issued a permit to Earth II to operate an incinerator (IEPA 1975). In February 1977, Cal Harbor took over the operations of Earth II on the Alburn Incineration area of the Site (IEPA 1977). In September 1978, Cal Harbor entered into a lease with Alburn, Inc. to take over the operations of the incinerator. In March 1979, Alburn, Inc. contracted with Chemical Incineration, Inc. to operate the incinerator, and Chemical Incineration, Inc. operated the Alburn facility until September 1979 (PRC Engineering 1986). By December 1979, Alburn, Inc. had terminated the Chemical Incineration contract and again taken over operation of the incinerator on the Alburn Incineration area of the Site (Hagarty 1979; IEPA 1982). From 1980 to 1982, it appears that Alburn, Inc. continued to operate the incinerator (Pierard 1983). Available documentation shows that, as of a June 1983 USEPA site inspection, another company, known as "American Incineration," was operating the incinerator at the Alburn Incineration area of the Site.



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In 1983, USEPA removed 36 bulk storage tanks, 6,000 drums, 239 five-gallon buckets, and 174,000 gallons of waste from a lagoon at the Alburn site. Surface soil was removed to a depth of six inches, and at least part of the Site was covered with a two-foot clay cap (ATSDR 2009).

<u>U.S. Drum</u>: The U.S. Drum facility (5.6± acres) was located at 2400 119th Street. The beginning of waste disposal operations specific to the U.S. Drum portion of the Site is difficult to identify. The U.S. Drum portion of the Site had been used as a disposal area for municipal and industrial wastes since the 1940s (PRC Engineering 1986). Thereafter, it was used as a waste transfer and solvent recovery facility, and later as a temporary storage and transfer facility for waste drums (ATSDR 2009). By the early 1970s, some type of drum staging operation was occurring on the U.S. Drum area of the Site (Hagarty 1984).

By 1975, the Earth II company was operating a waste transfer and solvent recovery facility, and a fire occurred on July 4, 1975. Operations on the U.S. Drum area were abandoned shortly thereafter, leaving behind 1,000 to 1,750 drums on the site (IEPA 1976). The storage and transfer facility was closed in 1979, at which time an estimated 34,100 gallons of waste were removed. In 1984, USEPA conducted an emergency removal at the U.S. Drum site, which included the removal of 435 cubic yards of soil, 62,000 gallons of standing water, and 3,000 drums. The areas of waste removal were then capped with clay and topsoil (ATSDR 2009).

<u>Unnamed Parcel</u>: There is little information available regarding the history of the Unnamed Parcel (38± acres). It is suspected that this area was filled at various times with dredged materials from the Calumet River, slag wastes from nearby steel mills, demolition debris, and municipal wastes (ATSDR 2009). By 1961, aerial photographs show landfill activity to the southeast had extended onto the eastern portion of the Unnamed Parcel area. By 1964, the landfill activities had expanded to encompass the Unnamed Parcel area, although the area appears to have been primarily used as a means to obtain access to the adjacent Paxton Landfill.

<u>Paxton Lagoons</u>: The Paxton Lagoons parcel (13 acres) was used as an industrial disposal site beginning in the 1950s (ATSDR 2009). By 1959, aerial photographs show that landfill activities at the Paxton Landfill had expanded to encompass a portion of what later became known as the Paxton Avenue Lagoons. Between 1964 and 1967, aerial photographs indicate the main lagoon was constructed. A 1973 aerial photograph shows further changes have occurred since the 1967 aerial photograph. By mid-1985, it appears that landfill activities at the Paxton Avenue Lagoons had been



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suspended (John Mathes & Associates, Inc. 1985). Beginning in 1989, IEPA conducted a removal action at the Paxton Lagoons in which the lagoons were drained, and approximately 16,000 tons of impacted soil were excavated and processed through an on-site mobile incinerator. USEPA conducted an emergency removal at the Paxton Lagoons site in 1990, removing 60 drums of waste materials and 2,200 cubic yards of acidic soil. IEPA subsequently placed an engineered clay cap atop the closed lagoons and fenced the Paxton Lagoon area in October 1993. In doing so, IEPA created two "notches" in the east-side fence line due to suspected illegal dumping during the removal action. These notches form two "out lots" of approximately one acre each that were excluded from the closure area.

2.4 Operable Unit One

As discussed in Section 1.0, remedial activities at the Site have to date been divided into two operable units. Operable Unit One is intended to provide source control related to impacted soils and buried waste materials present at the Site. Operable Unit One also addresses potential human health or ecological exposure pathways related to direct contact and potential migration of constituents via surface water runoff and soil erosion.

IEPA prepared a Focused Feasibility Study (FFS) (E&E 2006) to evaluate capping alternatives for Operable Unit One. Following completion of the FFS, IEPA issued a Proposed Plan and ROD for Operable Unit One in September 2006 (IEPA 2006), which was approved by USEPA. The alternative selected by IEPA in the ROD consists of placement of a low-permeability clay cap over the Site that meets the IEPA requirements for closure of a hazardous waste land disposal facility. IEPA initiated construction of the capping remedy in 2007, but stopped construction before completing the grading layer that was intended to establish drainage and slopes for the final cover system.

2.5 Prior Groundwater Investigations

This section presents a summary of the available groundwater sampling results from the historical monitoring well network. In the meeting among LCCS Group, USEPA, and IEPA representatives on July 7, 2012, IEPA indicated that existing monitoring





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wells at the Site were destroyed during the IEPA cap construction activities, and it is assumed that these monitoring wells no longer exist. ²

Groundwater investigations at the Site began in 1998, when three Geoprobe® water samples (GW1 through GW3) were collected by E&E. In April 1999, E&E installed several monitoring wells (LC01 through LC07 and LC09 through LC13) to supplement an older monitoring network (P01 through P05) that previously had been installed at the Alburn parcel, and monitoring well G21S that had been installed at the U.S. Drum parcel. Appendix C includes these boring logs. Monitoring wells LC02 and LC11 were installed with screens completely within native soils. Monitoring wells LC01, LC03, LC06, LC10, LC13, and P02 were installed with their screens completely within fill material. The remaining wells (LC04, LC05, LC07, LC09, LC12, P01, P03, and P04) were screened across the fill/native soil interface. No boring logs are available for monitoring wells P05 and G21S. Three nested well pairs were created as part of the 1999 groundwater investigation using newly installed and previously existing monitoring wells. These well pairs are comprised of P05/LC07, LC09/LC10, and LC11/LC12. A summary of previously installed monitoring well locations, depths, and screened intervals is provided in Table 1 and includes monitoring well locations at the Site, as well as locations on the Paxton I and Paxton II landfills, which were also sampled by IEPA as part of the historical groundwater monitoring activities at the LCCS.

A total of eighteen (18) monitoring wells (P01 through P05, LC01 through LC07, LC09 through LC13, and G21S) were sampled by IEPA in 1999 (E&E 1999). The groundwater samples were analyzed for a suite of constituents, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), total and dissolved metals, and nitrogen compounds (*i.e.*, ammonia, total cyanide, total Kjeldahl nitrogen, and nitrate-nitrite). The approximate locations of the Geoprobe® borings and monitoring wells sampled by E&E

pending a response by IEPA.

² Well abandonment logs or other records describing how the existing monitoring wells were closed either do not exist or are not available The IEPA's October 11, 2012 response to the LCCS Group's August 8, 2012 Freedom of Information Act (FOIA) request for well abandonment logs or other records did not include the requested information. A November 6, 2012 follow-up FOIA request to IEPA to confirm that no well abandonment logs or other records exist is currently



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in 1999, which include monitoring well locations at the Site and at Paxton I and Paxton II landfills, are shown on **Figure 3**.

In 2002, IEPA performed a groundwater monitoring event that included many of the same wells that had been sampled in 1999, in addition to a number of wells located on the Paxton I and Paxton II landfills (**Figure 3**). The groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and a suite of inorganic parameters, including total metals, nitrogen compounds, sulfate, phosphate, chloride, total dissolved solids, total suspended solids, and cyanide. Copies of the IEPA data tables from the 2002 groundwater monitoring event are provided in **Appendix D**.

An additional groundwater monitoring event was conducted by IEPA's contractor, E&E, in March 2007. Groundwater levels were measured at 14 existing Site monitoring wells (*i.e.*, LC05, LC06, G104, LC12, LC11, LC03, E, G20D, G20S, LC02, R21S, R21D, G21D, and G21S) and samples were collected at 12 of these existing wells (*i.e.*, LC05, LC06, G104, LC12, LC11, LC03, E, G20S, LC02, R21S, R21D, and G21S). Collected samples were analyzed for VOCs, SVOCs, and selected metals.

2.6 Summary of Groundwater Impacts

To provide an overview of Site conditions for RI planning, the 2002 and 2007 groundwater monitoring data for the Site were compared to the State of Illinois Groundwater Quality Standards (Illinois Administrative Code, Title 35, Part 620, Groundwater Quality). The groundwater monitoring data were compared to both Class I (Potable Resource Groundwater) and Class II (General Resource Groundwater) standards. In the 2002 and 2007 data sets, concentrations of certain metals, chloride, VOCs, SVOCs, and total PCBs exceeded these standards in at least one groundwater sample collected at the Site. These results are presented on **Figure 4**; data tables from the 2002 and 2007 monitoring events are provided in **Appendix D**. These groundwater data are not current and will be updated in the RI. Comparisons to other criteria will be made in the RI and risk assessments to identify Constituents of Potential Concern (COPCs) and locations of elevated COPC concentrations. Where appropriate, such criteria will include drinking water values (*i.e.*, Maximum Contaminant Levels [MCLs] and Tap Water Regional Screening Levels [RSLs]), ambient surface water quality standards, and, where applicable, background concentrations.

While no Illinois groundwater standard currently exists for total ammonia nitrogen, 15 milligrams per liter (mg/L) is a generally used surface water quality standard that is protective of aquatic life, wildlife, agricultural use, secondary contact use, and most



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industrial uses, and ensures the aesthetic quality of the State's aquatic environment (Illinois Administrative Code, Title 35, Part 302, Water Quality Standards). This screening concentration has historically been applied to ammonia in groundwater at the Site (IEPA 2002), presumably due to the potential for groundwater discharging to Indian Ridge Marsh. In the 2002 sampling, total ammonia nitrogen (ammonia-N) in groundwater was measured at concentrations exceeding the IEPA Water Quality Standard of 15 mg/L at nine Site monitoring locations: G22D, LC04, LC05, LC06, LC09, LC10, LC11, LC12, and LC13. The ammonia results are presented on **Figure 5**, and data tables from the 2002 IEPA monitoring event are provided in **Appendix D**. Total ammonia nitrogen (ammonia-N) was not analyzed for the groundwater samples collected by E&E in 2007.

During the 2002 IEPA monitoring event, concentrations of ammonia in groundwater samples collected at the neighboring Paxton I and Paxton II landfills also exceeded 15 mg/L (**Figure 5**). In addition, concentrations of VOCs, SVOCs, PCBs, and inorganic constituents, including several of the same constituents identified in wells within the Site, were found to exceed Class I and Class II Groundwater Quality Standards in the samples collected at the Paxton I and Paxton II landfills. Groundwater results for the monitoring wells sampled on the Paxton I and Paxton II landfills in 2002 are provided in the data tables in **Appendix D**.

2.7 USACE Indian Ridge Marsh Restoration Project

2.7.1 Site Setting and Description

Indian Ridge Marsh is an undeveloped, disturbed marshland that lies immediately to the east of the Site. It is bounded by Torrence Avenue on the east, 116th Street on the north, Norfolk Southern Railroad tracks on the west, and the Sidestream Elevated Pool Aeration (SEPA) station on the south. The marsh, considered a Palustrine wetland in an urban watershed, covers over 145 acres on the southeast side of Chicago between Lake Calumet and the Calumet River.

As part of the USACE's work in Indian Ridge Marsh, inventories of flora and fauna in the area were conducted and have shown that, while the marsh has habitat suitable for wildlife, it contains invasive plant species and has been subject to dumping, dredge material disposal, and migration of constituents from adjacent, neighboring properties. Pockets of critical habitat to be preserved and improved in Indian Ridge Marsh include the open water marsh, which supports a breeding population of the state-endangered black-crowned night heron (*Nycticorax nycticorax*), other bird species such as the



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state-threatened common moorhen (*Gallinula chloropus*), and other wildlife that may use the marsh as foraging grounds or habitat.

The USACE is currently conducting a restoration project in Indian Ridge Marsh, which is targeted for completion in the fall of 2015. The project involves vegetative habitat improvement, aquatic habitat improvements, hydraulic controls, and improved public access. Specifically, invasive plant species were removed using herbicides and prescribed burning, and new plants were planted to improve a variety of habitats and provide stabilization and decrease sediment runoff for the upland areas. Leaf compost inoculated with mycorrhiza was also incorporated into select upland areas. The leaf compost increases the organic carbon in the soils to facilitate binding of metals, pesticides, and polycyclic aromatic hydrocarbons (PAHs). To improve surface water quality, all common carp were removed. Hydraulic control measures included cleaning the culvert under 122nd Street and installing a water control structure south of 122nd Street within the ditch that connects with the Calumet River. Finally, the USACE removed 500 tons of debris including approximately 1,000 tires, improved the trail system, and constructed a boardwalk to link the Indian Ridge Marsh trail system to the Sidestream Elevated Pool Aeration station along the Calumet River (Pers. Comm. 2015).

Based on the results of sampling conducted by the USACE in Indian Ridge Marsh, it was determined that removal of sediments was not necessary to meet the goals of the ecological restoration project.

2.7.2 Indian Ridge Marsh Data

As part of the USACE restoration project, the potential ecotoxicity of environmental media (*i.e.*, soil, surface water, sediment) in Indian Ridge Marsh was assessed by Tetra Tech on behalf of the USACE. Results are documented in the Ecotoxicological Evaluation prepared by Tetra Tech in 2008 and in the 2009 Addendum to the report (Tetra Tech 2008, 2009). Surface water, sediment, and plant tissue data were collected in 1999, 2001, 2002, and 2009 (**Appendix D, Figure 6**).

Ecotoxicological benchmarks and background values were established for the Calumet area by the Calumet Ecotoxicology Roundtable Technical Team in 2007. Two different values were established for sediment and surface water -- Calumet Open Space Reserve (COSR) threshold and benchmark values. Relevant background concentrations were also established for the area. In the USACE evaluations, these concentrations were used to screen the data collected from Indian Ridge Marsh to



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evaluate whether constituent concentrations have the potential to adversely affect flora and fauna in the marsh (Tetra Tech 2008, 2009). The following sections discuss the results of the ecotoxicological evaluation.

2.7.2.1 Sediment Data

While a few metals (e.g., lead, manganese, zinc) in surface sediment exceed COSR benchmarks, the majority of constituents are below the COSR benchmarks or background levels, including PAHs and pesticides (Tetra Tech 2008).

In 2009, sediment samples were evaluated for acid volatile sulfides/simultaneously extracted metals (AVS/SEM). Results indicate that the ratio of SEM to AVS was below 1, indicating that metals in sediment are bound to sulfides and are unlikely to be bioavailable to benthic organisms. As a result, toxicity from metals in sediment is not anticipated (Tetra Tech 2009).

Four sediment samples collected in 2009 were submitted to American Aquatic Testing, Inc., where a 20-day bioassay toxicity test with the freshwater invertebrate *Chironomus dilutus* was conducted. At the end of the test, surviving organisms were counted and weighed. The bioassay results did not exhibit toxicity and indicated no adverse effects on benthic invertebrate survival or growth from constituents in Indian Ridge Marsh sediments. These findings supported the AVS/SEM evaluation and were interpreted as indicating that PAHs and pesticides identified in sediment samples from Indian Ridge Marsh sediments are bound to the total organic carbon fraction and are not bioavailable.

Based on this information, the USACE ecotoxicology study of Indian Ridge Marsh concluded that there does not appear to be a need for further evaluation of the sediment or rehabilitation of the sediment as part of ecological restoration activities. No sediment removal from Indian Ridge Marsh is needed to meet the goals of the ecological restoration project.

2.7.2.2 Surface Water Data

Most detected constituents in surface water in Indian Ridge Marsh are below COSR benchmarks or background values. Only iron and manganese exceed COSR benchmarks, and metals concentrations in surface water are unlikely to pose adverse effects to aquatic organisms in Indian Ridge Marsh (Tetra Tech 2008).



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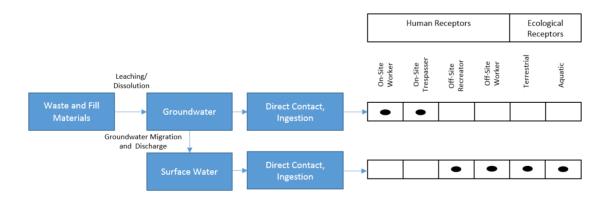
Total ammonia-N concentrations in surface water samples collected in 2009 from Indian Ridge Marsh ranged from non-detect (< 0.6 mg/L) at SW-08 and SW-09 to 4.5 mg/L at SW-07. The ammonia concentrations found in the 2009 sampling were generally lower than those found in prior sampling (Roadcap, *et al.* 1999).

2.7.2.3 Plant Tissue Data

In 2009, four samples of three different species of plants (flowering crabapple [Malus sp.], reed canary grass [Phalaris arundinacea], and fleabane [Erigeron philadelphicus]) were collected from Indian Ridge Marsh and analyzed for metals. Results indicate minimal accumulation of metals in plant tissue, with average bioaccumulation factors ranging from 0.006 to 0.535 (Tetra Tech 2009). As a result, metals in surface soils in the marsh are unlikely to cause adverse effects to ecological receptors, and soil in Indian Ridge Marsh is not a medium of concern for marsh receptors.

2.8 Preliminary Conceptual Site Model and Exposure Assessment

Based on the site setting and geological and hydrogeological characterization to date, a preliminary conceptual site model (CSM) and evaluation of potential exposure pathways for Operable Unit Two has been developed (see the flow chart below).



The geological and hydrogeological aspects of the CSM, as well as chemical information collected from previous characterization efforts, are presented in the previous sections. An evaluation of exposure routes based on the preliminary CSM indicates the following:



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- Human health exposure routes related to use of groundwater as drinking water are incomplete because groundwater is not used as a drinking water source in the vicinity of the Site and such use is prohibited by ordinance within the City of Chicago.
- Direct contact exposure routes associated with non-potable household or commercial use of groundwater are also incomplete due to the lack of groundwater withdrawal for such purposes and the absence of residential, commercial, or industrial development in the immediate vicinity of the Site.
 Direct contact exposure routes associated with intrusive work (such as construction) are potentially complete for on-site workers or trespassers.
- Exposure routes related to recreational scenarios and off-Site workers at Indian Ridge Marsh are potentially complete because of the potential for groundwater discharge to surface water within Indian Ridge Marsh and direct contact, ingestion, or inhalation exposures to recreational users. Exposure routes related to ecological receptors may also be complete via discharge of groundwater to Indian Ridge Marsh.

Additional details regarding the Baseline Human Health Risk Assessment and Baseline Ecological Risk Assessment are presented in Sections 4 and 5 of this Work Plan, respectively. The presence or absence of constituents in groundwater discharging to Indian Ridge Marsh is uncertain, and this uncertainty will be addressed, along with other data gaps, through the RI as discussed below.

2.9 Groundwater Data Gaps

Based on review of the available groundwater data for the Site presented in the 1999 E&E, 2002 IEPA, and 2007 E&E reports, additional data are required to fully characterize the Site groundwater conditions and facilitate development of a comprehensive CSM. ARCADIS has identified a number of areas requiring further study in order to define the nature and extent of groundwater impacts attributable to the former operations at the Site, including the following:

- Groundwater flow direction;
- Hydraulic properties of the upper water-bearing zone;
- Flux of constituents across the Site and potential discharge to Indian Ridge Marsh;



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- Contributions of constituents to Site groundwater from off-site sources, including the Paxton I and Paxton II landfills; and
- Geochemical characteristics of Site groundwater.

The approach for further characterizing the Site and addressing these data gaps is described in **Section 3** below. In addition to supporting the groundwater CSM, results of the Site groundwater characterization tasks will allow for an assessment of potential risks to human health and the environment and will provide data to develop and evaluate remedial alternatives, in the event groundwater remediation is deemed necessary. If elevated Constituent of Potential Concern (COPC) concentrations are found in the groundwater venting to Indian Ridge Marsh or otherwise migrating offsite, a focused investigation as to the source of those COPCs may be conducted, if practicable, to assess how or if that source could be abated.

3. Site Characterization Tasks

The Site characterization tasks included in this RI/FS Work Plan were developed based on review of the currently available historical Site data. In addition, these tasks account for the current Site conditions, in which all existing monitoring wells at the Site were reportedly abandoned during IEPA's construction of the grading layer for the Operable Unit One capping system.

Given the scope of the Operable Unit Two (groundwater) activities and the suspended Operable Unit One capping, a detailed Site topographic map showing the current Site configuration is not required. Instead, as a prefatory step to other Site characterization activities, ARCADIS will identify available Site mapping and aerial photography to confirm that a base map of suitable horizontal scale, topographic detail (e.g., contour interval), utility location, and property (parcel) definition is available. Additional surveying will be conducted as needed to address gaps in required Site mapping and establish horizontal and vertical control points.

The principal objectives of the Site characterization investigation are the following:

- Establish a well network to evaluate horizontal and vertical hydraulic gradients, hydraulic conductivities, and groundwater flow direction;
- Evaluate the hydrogeologic conditions needed to define the classification of Site groundwater;



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- Evaluate the horizontal and vertical distribution of constituents in groundwater across the Site;
- Evaluate the flux of constituents leaving the Site through groundwater and potentially discharging to Indian Ridge Marsh;
- Inspect for the possible presence of seeps along the Site boundary, especially on the eastern side near the Norfolk Southern railroad trails and sample such seeps if found; and
- Evaluate constituent contributions to Site groundwater from off-site sources, including the Paxton I and Paxton II landfills.

The following sections present the approach and methods that will be used to meet these objectives. To the extent practicable, Site characterization activities will be planned and implemented to avoid disturbance of potentially jurisdictional wetlands.

3.1 Phased Approach

The proposed groundwater investigation activities will be completed using a phased approach, whereby the information gained from the first phase will be evaluated and subsequent phases may be altered accordingly to meet the objectives of the overall investigation. The phased investigation approach will consist of the following:

- Phase 1 Piezometer Installation;
- Phase 2 Geoprobe[®] Hydraulic Profiling Tool (HPT) / Vertical Aquifer Profiling (VAP) transects; and
- Phase 3 Monitoring Well Installation.

The details of each phase of the Site characterization are discussed in the subsequent sections.

3.2 Phase 1 - Piezometer Installation

In prior groundwater monitoring, varying groundwater flow patterns have been inferred within the Site boundaries. Radial groundwater flow was suggested by E&E in its 1999 report, which depicted groundwater flow toward Indian Ridge Marsh (east) and Big



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Marsh (north). Additional groundwater elevation contours constructed in 2002 by IEPA used a larger number of wells, and groundwater flow direction was shown to be to the east and southeast within the Site boundaries (IEPA 2002a). The 2007 water level data collected by E&E indicates a predominant flow direction to the east.

Due to the variations observed in the potentiometric surfaces presented in historical reports, and because former Site monitoring wells are no longer available, it will be necessary to install piezometers across the Site to determine the groundwater flow direction. A Site-wide understanding of the groundwater flow direction is an important component of this investigation because it will allow the HPT/VAP transects installed during Phase 2 to be orientated perpendicular to the groundwater flow direction. A total of twenty (20) piezometers will be installed during Phase 1 of the Site hydrogeologic investigation for purposes of evaluating the groundwater flow direction at the Site and will also allow for data collection related to vertical gradients. The locations of these piezometers are shown on **Figure 7** and are as follows:

- Five (5) shallow downgradient piezometers along the eastern edge of the Site to increase resolution along the Site boundary with Indian Ridge Marsh;
- Four (4) shallow upgradient piezometers along the western property boundary;
- Six (6) deep piezometers (clustered with shallow piezometers) to provide information on vertical gradients and deeper hydrostratigraphic units; and
- Five (5) piezometers in the west central portion of the Site.

3.2.1 Piezometer Installation

The piezometers will be installed using direct-push technology (DPT) drilling methods. The shallow piezometers will be installed to intersect the water table and will be screened in the fill unit, with a maximum anticipated depth of 20 ft bgs. The deep piezometers will be paired with the shallow piezometers and installed in the first sand unit encountered below the fill unit, with estimated depths of 35 to 45 ft bgs. At each location, a continuous soil core will be collected from ground surface to the maximum depth of the piezometer(s) being installed. The soil cores will be logged to characterize the lithology and determine the depth of the water table. The final locations and depth of each piezometer will be determined in the field and will be adjusted based on geologic and hydrogeologic observations.



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Piezometers will be constructed of a one-inch diameter, Schedule 40 polyvinyl chloride (PVC), 10-slot well screen completed with a pre-packed sand filter. The screen will be connected to a Schedule 40 PVC riser, which will extend to approximately three feet above ground surface. The well piezometer installation will be completed by adding additional filter sand on top of the pre-pack to increase the sand level to a minimum of one foot above the top of the well screen. A hydrated bentonite seal will then be placed to fill the annulus around the riser to the ground surface. The piezometers capped with expandable well plug and secured above-grade with a lockable steel surface completion.

After the piezometers are installed, they will be developed to ensure communication with the surrounding formation. Development will be completed using a combination of surging and pumping / over-pumping development methods. Development will be complete when, in the judgment of field personnel, turbidity has been reduced to the extent practical, or after a maximum of five well volumes of water are removed, whichever occurs first.

3.2.2 Data Collection and Evaluation

Following installation, the newly installed piezometers will be surveyed to State Plane Coordinates to establish the horizontal locations and North American Vertical Datum (NAVD) 88 to establish the elevations. Survey data will include northing, easting, and elevation (ground surface and top of casing).

The piezometers will be gauged a minimum of two times, with at least one week between readings to allow the potentiometric surface and groundwater flow direction to be evaluated. If the potentiometric surfaces are consistent in the two sets of data, the resulting groundwater flow direction will be used to finalize the layout for HPT/VAP transects, which will be completed during Phase 2. If the flow directions are not consistent, two additional gauging events will be completed, and the variability in the flow directions will be evaluated to determine the proper transect placement needed to meet the project objectives.

Additional water level measurements will be collected to characterize flow directions and variability. These activities will include monthly water level gauging or installation of transducers and data loggers at selected piezometers. Precipitation events and amounts will be tracked over the gauging period.



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Existing off-Site monitoring wells will be added to the gauging program as appropriate. Most of the existing off-Site wells are completed in the fill (15 to 20 feet deep) and would be suitable for gauging if deemed necessary. Any wells that are used will be surveyed and added to Site maps.

3.3 Phase 2 - HPT / VAP Transects

Phase 2 of the investigation will consist of a combination of HPT and VAP borings. This combined investigation approach will be implemented to collect the necessary data to meet the following objectives:

- Characterize the hydrostratigraphic framework;
- Evaluate the vertical and lateral constituent mass distribution; and
- Identify potential groundwater transport pathways.

The currently planned locations of the HPT/VAP borings are shown on **Figure 7**; locations will be finalized upon completion of Phase 1. The following sections describe the methods that will be used to complete the HPT borings and VAP sampling. Additional information is included on the end use of the data and the visualization platform that will be used to present the high-resolution data.

3.3.1 Hydraulic Profiling Tool (HPT)

The HPT investigation includes a series of activities that will be used to characterize the hydrostratigraphic framework at the Site. The activities include three key elements, which are described in detail in the subsequent sections:

- HPT soundings;
- Soil core collection; and
- Hydraulic testing.

3.3.1.1 HPT Soundings

The HPT will be used to generate soundings indicating relative permeability throughout the depth investigated. The HPT is attached to the end of a Geoprobe® drill string that



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enables a continuously metered injection of a small volume of a fluorescent dye and water mixture (50 to 300 milliliters per minute) during advancement of the probe. Simultaneously, the fluid backpressure due to the injection into the formation is measured and logged at frequent intervals along with the flow data. After correcting for the equipment head losses, the flow and pressure are plotted as a relative permeability (or hydraulic conductivity) curve by recognizing that hydraulic conductivity (K) is the constant of proportionality of flow divided by pressure. The resulting data (flow and pressure) from each location are comparable within the vertical profile at each location, as well as between soundings across transects.

The HPT probe is generally able to resolve the relative permeability of soils and other unconsolidated materials with a hydraulic conductivity of 10⁻² centimeter per second (cm/sec) or lower. If the HPT profiles indicate the soil hydraulic conductivity is generally lower than 10⁻² cm/sec, hydraulic testing (*i.e.*, slug tests at discrete intervals) will be completed at several depth intervals to verify and calibrate the HPT results. Conversely, if the HPT indicates that a majority of the aquifer at the Site has a hydraulic conductivity greater than 10⁻² cm/sec, and too high to be resolved effectively by HPT probe, HPT will be discontinued and hydraulic testing will be completed at additional sample intervals to help estimate the mass flux within the groundwater plume. The hydraulic testing is discussed in **Section 3.3.1.3**.

The preliminary layout of the borings is shown in **Figure 7**. At each location, the HPT tooling will be advanced to a depth of approximately 50 feet bgs. This total depth was determined based on the lithologic and groundwater quality data available for the Site, which indicate that the vertical extent of impact is limited to the fill and shallow sand units. If necessary, based on the field conditions and the data collected, HPT/VAP borings will be extended deeper to assess the vertical extent of COPCs. In addition, up to four HPT/VAP borings will be advanced to refusal, which should be at or just above bedrock. The determination of whether installation of one or more deep wells screened above bedrock is necessary will be based on an evaluation of the data collected from the deep HPT/VAP borings during Phase 2 of the groundwater investigation.

3.3.1.2 Soil Core Collection

Geoprobe® soil borings will be completed at approximately 30 percent of the locations of the HPT soundings. Soil cores will be collected from these borings using either a Geoprobe® Macro Core or Dual-Tube sampling system. Cores will be characterized using a classification system with elements incorporated from various accepted



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standards such as the American Society for Testing and Materials (ASTM) D2488-06, the Unified Soil Classification System, and the Burmister and Wentworth system. The detail obtained through this classification will be used to characterize the HPT responses to particular soil lithologies. The total number of borings will be based on field conditions and may be increased depending on the variability in the HPT responses and the fill/soil lithologies observed.

3.3.1.3 Hydraulic Testing

Hydraulic conductivity testing will be completed at selected intervals along the borehole using a Geoprobe® pneumatic slug test kit. A pneumatic slug test device creates a seal within the Geoprobe® drill string and uses air pressure to displace groundwater within the drill string and screen-point sampling assembly. When the water level within the well reaches equilibrium with the increased pressure, the pressure is released instantaneously, and the recovery of the water level to static conditions is recorded with a pressure transducer. The drill string and screen-point sampling device serve as a "temporary well" for the purpose of hydraulic conductivity testing and to collect the groundwater samples. This screen point sampling device will also be used to collect the VAP samples, which are discussed in **Section 3.3.2**.

The pneumatic slug tests using direct-push tooling will support interpretation of the HPT data and placement of permanent monitoring well screens. Slug tests at permanent wells will be conducted to support groundwater classification.

3.3.2 Vertical Aquifer Profiling (VAP)

Once the HPT borings are completed, the VAP sampling will begin. The data collected during VAP sampling will aid in characterizing the vertical distribution and concentrations of constituents. The data collected from the VAP samples will be used in determining permanent monitoring well placement. The sampling data from the permanent monitoring wells will be used in risk assessment and for comparisons to chemical-specific applicable or relevant and appropriate requirements (ARARs).

Prior to starting the borings for collection of the VAP samples, the HPT data will be evaluated and the permeable zones identified at each VAP sampling location. The permeable zones will be the target for collection of the VAP samples because these areas represent the potential groundwater transport pathways at the Site. The groundwater samples will be collected at each location beginning at the water table and continuing at 5- to 10-foot intervals until the base of the borehole is reached. An



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estimated five samples will be collected at each location; however, additional samples may be added and sample depths adjusted as necessary to adequately characterize the permeable flow zones.

Groundwater samples will be collected through the drilling rods, which will be attached to a Geoprobe® screen-point sampling device. The screen-point sampler will be driven to the bottom of the target interval. Once the appropriate depth has been reached, the drill string will be pulled up approximately one foot, exposing the screen to the target sample interval. A peristaltic pump or bladder pump will then be used to purge the sample interval until free of fine-grained material. Once purged, the flow rate will be reduced to allow sample collection. At each proposed sample interval, a minimum of three casing volumes of groundwater will be removed prior to sample collection. Field parameters, including pH, conductivity, DO, ORP and turbidity, will be collected during purging.

As discussed in **Section 3.3.1.1**, the water introduced during the HPT sounding will be mixed with fluorescent dye. The presence of this dye will then be evaluated during the purging of the VAP sample locations to ensure that the water introduced during the HPT profiling does not affect the results of the groundwater sampling. If dye is observed in the purge water during the groundwater sampling, the purging will continue until the dye is no longer visible in the sample.

The VAP groundwater samples will be analyzed for the following parameters:

- VOCs;
- Total and dissolved metals; and
- Ammonia.

The analyte list for the VAP sampling was determined based on evaluation of the historical groundwater data at the Site (**Section 2.4**) and the practical limits of what can be analyzed using the VAP sampling method. Because they are not collected from developed monitoring wells, VAP samples can be turbid, and data on total metals may not be reliable or usable. In an effort to maximize the useful data generated in the VAP sampling, samples will be collected for both total and dissolved metals analyses, and field turbidity measurements will be collected to support interpretation and evaluation of metals data. The full suite of analytical parameters will be analyzed once the permanent monitoring wells are installed, as discussed in **Section 3.4.3**.



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Groundwater samples will be packed on ice and shipped to the project laboratory under appropriate chain-of-custody procedures. The majority of samples will be analyzed using a standard laboratory turnaround time; however, it will be necessary to analyze some of the initial samples on an expedited turnaround (24 to 48 hours) to aid in determining that the depths of the boreholes are sufficient to achieve vertical delineation of the constituents.

3.3.3 Data Evaluation

The activities completed during Phase 2 of the investigation will provide considerable data needed to meet the overall objectives of the evaluation. At the completion of Phase 2, the following data will be available:

- Classification and characterization of the hydrostratigraphic framework;
- Vertical and lateral representation of the constituent mass distribution in groundwater;
- Upgradient constituent data to evaluate potential contributions from off-site groundwater sources; and
- Determination of the relative mass flux of constituents in groundwater at HPT/VAP transects using the K data and constituent concentrations.

The nature of the data generated during Phase 2 of the investigation will require the use of data visualization software to assist in the evaluation process. For this evaluation, ARCADIS will utilize the Environmental Visualization System (EVS) software, developed by C-Tech Development Corporation, or equivalent, to visualize the data. The EVS software can effectively combine analytical results from the VAP sampling with lithologic data obtained during visual core logging and the HPT results to help in developing a comprehensive groundwater CSM. Data collected during Phase 2 of the investigation will be incorporated into the model and will be used to identify potential constituent migration pathways and zones of relatively high constituent mass flux.

The evaluation of off-site contributions to COPCs in groundwater will be completed using the HPT/VAP locations both upgradient and along the edges of the property (*i.e.*, side gradient). The flow direction at the time of sampling will be used to determine the position of HPT/VAP borings with respect to the Site and off-site properties. Data on



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COPC concentrations from upgradient sources (*e.g.*, Land & Lakes Landfill, Paxton II Landfill) or cross-gradient sources (*e.g.*, Paxton I Landfill) will be examined to assess whether these sources are causing or contributing to COPC concentrations observed at or downgradient of the Site.

3.4 Phase 3 – Monitoring Well Installation

The data collected during the HPT and VAP portion of the investigation will be used to determine locations for the installation of monitoring wells. The number of wells will be determined based on the results of Phase 2; however, it is estimated that eight to twelve well pairs or clusters will be needed to adequately characterize the Site. The locations of the wells will be selected using the following criteria:

- Two to three wells will be installed at each location to allow for evaluation of vertical stratification of the aquifer and vertical hydraulic gradients;
- Wells will be screened in specific identified mass-bearing hydrostratigraphic units (HSUs), with screen lengths customized based on the thickness of the HSU to avoid potential communication between HSUs;
- Well clusters will be distributed laterally to provide reproducible monitoring locations that are adequate for evaluating the horizontal hydraulic gradient and groundwater flow direction;
- A subset of the well clusters will be located along the upgradient portion of the Site to evaluate potential constituent contributions from off-site sources; and
- Wells will be installed to assess COPCs in groundwater currently emanating from the Site.

3.4.1 Groundwater Monitoring

The proposed monitoring wells will be installed using hollow-stem auger drilling methods in accordance with the guidelines presented in Section 920.170 of the Illinois Administrative Code (Monitoring Wells). Proposed locations and details for the proposed monitoring wells will be submitted to the USEPA for review and approval upon completing the evaluation of the Phase 2 data, and prior to mobilizing for Phase 3 groundwater monitoring.



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Following installation, the permanent groundwater monitoring wells will be developed to ensure adequate hydraulic communication with the surrounding formation. Development will be completed using a combination of surging and pumping/over-pumping development methods. Development will be complete when the water is free of visible sediment, and the pH, temperature, turbidity, and conductivity are stable within 10 percent for three consecutive readings.

Groundwater level measurements will be collected at wells prior to sampling. Groundwater samples will be collected using low-flow sampling methods, and samples will be packed on ice and shipped to the project laboratory in accordance with appropriate chain-of-custody procedures. Based on review of the historical data (Section 2.6), parameters to be analyzed in the Site groundwater samples will include:

- Field parameters: dissolved oxygen (DO), pH, conductivity, turbidity, temperature, and oxidation-reduction potential (ORP);
- Target Compound List (TCL) VOCs, SVOCs, PCBs, and pesticides;
- Total and dissolved Target Analyte List (TAL) metals;
- Nitrogen compounds: ammonia-N, nitrate-N, and nitrite-N;
- Geochemical characterization parameters: sulfate, sulfide, total suspended solids (TSS), and total organic carbon (TOC); and
- Dissolved gases: methane, carbon dioxide, oxygen, and nitrogen.

Table 2 summarizes the analytical methods, sample containers, preservatives, and holding times for the parameters to be analyzed in the Site groundwater samples. Geochemical characterization parameters will be collected to evaluate groundwater oxidation-reduction conditions and geochemical controls on constituent fate and transport at the Site, while dissolved gases will be collected to evaluate the potential for landfill gas generation. In order to evaluate groundwater concentration trends in relation to seasonal changes, the Phase 3 groundwater monitoring wells and any offsite wells needed for Site groundwater characterization will be sampled on a quarterly basis for a period of one year (*i.e.*, four sampling events). The Site characterization tasks described above will be conducted in accordance with the USEPA-approved Field Sampling Plan and Quality Assurance Project Plan.



4. Baseline Human Health Risk Assessment

4.1 Background

As part of the Operable Unit Two RI/FS, a Baseline Human Health Risk Assessment (BHHRA) will be performed to assess potential current and future health risks to receptors that may be exposed to constituents in groundwater associated with the Site. The BHHRA is an integral part of the study of the Site and is designed to assist risk managers in making informed decisions regarding actions necessary to address hazardous substances.

The City of Chicago Department of Environment previously conducted a Human Health Risk Assessment for groundwater, soil, sediments, and surface water at the Alburn Incinerator, U.S. Drum, and Unnamed Parcel Areas (MWH 2002). Groundwater data were compared to Illinois TACO Class I Groundwater ROs to select COPCs. As no significant use of the Site was occurring during the preparation of the HHRA, a possible future use of the parcel as a solar-powered generating station was considered for the identification of potential receptors and exposures. A CSM was developed and identified three categories of on-site workers in which the receptor / exposure pathway combinations were judged likely to be complete: an on-site worker, a construction worker, and an industrial / commercial worker. The highest detected concentration of each COPC in groundwater was used as the exposure point concentration (EPC). Exposure estimates were calculated using standard USEPA exposure estimation equations. Reference doses (RfDs) and cancer slope factors (SFs) were obtained from USEPA's Integrated Risk Information System (IRIS) or Health Effects Assessment Summary Tables (HEAST). A few values that were not available in IRIS or HEAST were obtained from USEPA Region 9 2001 Preliminary Remediation Goal (PRG) Table, Oak Ridge National Laboratory's (ORNL) Risk Assessment Information System (RAIS), or through personal communications with USEPA personnel.

The calculated cancer risk and non-cancer hazard estimates for groundwater are presented in **Table 3** below. The estimated excess lifetime cancer risk (ELCR) and total estimated hazard indices (HIs) for the Alburn Incinerator, U.S. Drum, and the Unnamed Parcel were all below 10⁻⁶ and 0.1, respectively, for all receptors identified in the CSM. These estimated ELCRs and HIs are below the 10⁻⁴ to 10⁻⁶ ELCR range and HI of 1 generally considered acceptable by EPA. Overall, the HHRA indicated that groundwater poses no unacceptable risk to workers.

Table 3. Summary of Human Health Risk Estimates



Total Non-cancer Hazard Index	On-Site Worker	Construction Worker	Industrial/ Commercial Worker					
Alburn Incinerator								
Total Excess Lifetime Cancer Risks	8.E-07	3.E-08	8.E-07					
Total Noncancer Hazard Index	1.E-02	1.E-01	1.E-02					
U.S. Drum								
Total Excess Lifetime Cancer Risks	4.E-07	1.E-08	4.E-07					
Total Noncancer Hazard Index	3.E-03	4.E-02	5.E-04					
Unnamed Parcel								
Total Excess Lifetime Cancer Risks	2.E-07	9.E-09	2.E-07					
Total Noncancer Hazard Index	4.E-04	4.E-03	4.E-04					

The BHHRA conducted as part of the Operable Unit Two RI/FS will be focused on potential human health impacts associated with exposure to constituents that are present in groundwater associated with the Site or that are emanating from the Site to adjacent areas. Concentrations detected in the exposure media associated with this area will be combined with assumptions about the ways that people may be exposed to those media to estimate potential Site-related risks. These risks will then be compared with USEPA's acceptable risk range and target hazard index to determine if there is a potential for unacceptable health risks to occur. If the BHHRA indicates potentially unacceptable human health cancer risks or non-cancer hazards, the results of the BHHRA will be used to develop RAOs in the FS and, as necessary, to make a series of site-specific risk management decisions during the remedy-selection process. The BHHRA will be conducted in accordance with USEPA and IEPA guidance including, but not limited to, the following:

 Risk Assessment Guidance for Superfund (RAGS) – Parts A, D, and E (USEPA 1989, 1998a, 2004);



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- Supplemental Guidance to RAGS: Calculating the Concentration Term (USEPA 1992a);
- The Lognormal Distribution in Environmental Applications (USEPA 1997a):
- Exposure Factors Handbook (USEPA 2011); and
- Tiered Approach to Corrective Action Objectives (TACO), Ill. Adm. Code Title 35, Part 742.

Consistent with guidance developed by USEPA (1989), the BHHRA will include the following basic components: hazard identification, exposure assessment, toxicity assessment, and risk characterization. In the hazard identification step, the BHHRA defines the COPCs. The exposure assessment identifies exposed populations and potential exposure pathways, develops exposure scenarios and assumptions, estimates EPCs, and calculates doses for each pathway. The toxicity assessment provides a compilation of quantitative and qualitative toxicity information about each COPC and identifies toxicity values descriptive of the dose-response relationships. Finally, the risk characterization estimates and summarizes the cancer risks and non-cancer hazards for each exposure pathway and population potentially at risk. In addition, the BHHRA will describe the degree of certainty and conservatism associated with each component of the BHHRA.

4.2 Approach

The BHHRA will be performed to assess current and future health risks to people that may be exposed to groundwater constituents emanating from the Site that may migrate into the adjacent Indian Ridge Marsh. As discussed in **Section 1**, a grading layer has been installed across the entire Site as part of the Operable Unit One remedial action. Placement of this grading layer and the remaining cap components to be installed effectively eliminates the potential for direct-contact exposure to on-site groundwater. Moreover, there is no current use of Site groundwater and no reasonable probability of future consumptive use of Site groundwater given the past, current, and reasonable future uses of the Site and surrounding properties. A City of Chicago ordinance prohibits the installation of drinking water wells. Therefore, realistically, current and future exposure pathways to on-Site constituents have been eliminated. The only foreseeable exposure route to humans is from the potential migration of constituents in groundwater to Indian Ridge Marsh sediment and surface water.





The following sections describe how the BHHRA will be conducted for the Site.

4.2.1 Hazard Identification

The first step in the BHHRA process is to identify potential hazards at the Site. This includes identifying COPCs and establishing exposure point concentrations for them.

4.2.1.1 COPC Screening

To identify COPCs for the BHHRA, constituent concentrations in the groundwater venting from LCCS to Indian Ridge Marsh will be compared to Illinois' Numeric and Derived Water Quality Standards (35 IAC 302.208, 302.210, and 302.407) and other appropriate benchmarks for the protection of human health. If COPCs are identified in venting groundwater, additional investigation of surface water and sediment in Indian Ridge Marsh may be needed in order to determine representative concentrations and EPCs of COPCs in those media.

For groundwater emanating from the LCCS with the potential to be used as a water supply (based on hydrogeologic factors or institutional controls), constituent concentrations will be compared to MCLs and Tapwater RSLs for purposes of identifying COPCs.

COPC screening will consider data collected as part of the RI and recently collected surface water and sediment data in Indian Ridge Marsh (Tetra Tech 2008, 2009). Only constituents with detected concentrations in groundwater emanating from the Site will be evaluated in surface water and sediment. Concentrations of Site-related, detected constituents in sediment and surface water will be compared to risk-based screening levels for inclusion in the BHHRA. Because there are no human health-based screening concentrations for sediment, maximum detected concentrations in sediment will be conservatively compared to the lower of USEPA's Regional Screening Levels (RSLs) for Residential Soil, or IEPA's TACO Tier 1 values for human health. Maximum detected concentrations in surface water will be compared to Illinois' Numeric and Derived Water Quality Standards (35 IAC 302.208, 302.210, and 302.407) for the protection of human health. If the maximum detected concentration of a constituent exceeds the surface water quality standard or criterion, the constituent will be retained as a COPC in the BHHRA.



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4.2.1.2 Exposure Point Concentrations

To estimate COPC exposure, EPCs will be calculated as the average of the concentration that is contacted at the exposure point or points over the exposure period (USEPA 1989). To assure that the estimate of the average is conservative and will not be underestimated, the 95 percentile upper confidence limit on the mean of the data (95UCL) will be used as an estimate of the EPC (USEPA 1989).

USEPA recommends caution in the use of 95UCLs for small datasets (e.g., < 4 to 6 detects or 8 to 10 total samples) as well as larger datasets with low frequency of detection (e.g., < 30 percent) because the performance of the various methods may not be reliable in these cases. USEPA recommends a minimum of ten detected concentrations and eight total samples to calculate 95UCLs. When these dataset criteria are not met, maximum concentrations will be selected as the EPC.

4.2.2 Exposure Assessment

As identified in the CSM, persons using Indian Ridge Marsh for recreational purposes will be evaluated as the current and future receptors potentially exposed to COPCs in sediment and surface water via incidental ingestion and dermal contact. Future construction workers and park employees at Indian Ridge Marsh will also be evaluated as potential receptors in the BHHRA.

4.2.3 Toxicity Assessment

The toxicity assessment involves quantifying the relationship between the magnitude of potential exposure to COPCs via a particular exposure pathway and the likelihood of an adverse health effect. Adverse health effects are characterized by USEPA as carcinogenic or non-carcinogenic. Dose-response relationships are defined by USEPA for oral and inhalation routes of exposure. The results of the toxicity assessment, when combined with the dose estimated in the exposure assessment, are used to estimate potential health risks.

Toxicity values are developed by USEPA, state regulatory agencies and other entities after a comprehensive scientific review of all available toxicological literature and doseresponse information for a constituent. The toxicity values that will be used in the BHHRA for all COPCs (with the exception of lead) will be obtained from the following sources, in order of priority, per USEPA guidance (USEPA 2003):



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- Tier 1 USEPA's Integrated Risk Information System (IRIS) (USEPA 2010);
- Tier 2 USEPA's Provisional Peer Review Toxicity Values;
- Tier 3 Other toxicity values including those from additional USEPA and non-USEPA sources, including but not limited to the following:
 - o USEPA's Health Effects Assessment Summary Tables (HEAST);
 - Values developed by ATSDR; and
 - Values developed by the California Environmental Protection Agency (CalEPA).

For those chemicals for which BHHRA toxicity values are not available from Tiers 1 (IRIS) and 2 (PPRTV), the lowest value from the Tier 3 (other) sources should be used for screening purposes

The potential for adverse effects from exposure to lead will be evaluated for all receptors based on current guidance for evaluating theoretical lead exposures (USEPA 2001). Potential hazards due to lead exposures for child bird watchers will be evaluated using USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead exposures in children (USEPA 2005). The evaluation of lead exposures in sediments for adult bird watchers and construction workers will be evaluated using the Adult Lead Model (USEPA 2001). Also, for evaluating lead risks, blood lead models will include evaluations using both 5 and 10 micrograms per deciliter (µg/dl) in order to bracket the potential risks from lead exposure.

4.2.4 Risk Characterization

The risk characterization combines the results of the exposure and toxicity assessments to provide a quantitative estimate of the potential for carcinogenic and non-carcinogenic human health effects due to exposure to COPCs. Conservative estimates of cancer and non-cancer risks will be calculated for all receptors potentially exposed to COPCs that have been detected in groundwater associated with the Site. The estimates of potential risk will then be compared to USEPA's acceptable risk range and target hazard index to determine whether the estimated current and potential future risks exceed those benchmarks and, thus, may present an



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unacceptable exposure. The BHHRA will present these potential risk estimates and further define and discuss the levels of uncertainty surrounding them.

5. Baseline Ecological Risk Assessment

5.1 Background

An ecological risk assessment (ERA) will be conducted to evaluate potential risks to ecological receptors that may be exposed to constituents in groundwater emanating from the Site. The ERA will follow USEPA guidance, including, but not limited to, the following:

- Framework for Ecological Risk Assessment (USEPA 1992b);
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (USEPA 1997b); and
- Guidelines for Ecological Risk Assessment (USEPA 1998).

The Calumet Ecotoxicology Protocol (Calumet Ecotoxicology Roundtable Technical Team 2007) will also be followed, to the extent CATP guidance and USEPA guidance differ, because of its relevance given that it is what is being followed in the restoration of Indian Ridge Marsh, which is expected to be completed and closed out this year.

The ERA process, as outlined by USEPA (1997) consists of eight major steps:

- Step 1: Screening-level problem formulation and toxicity evaluation;
- Step 2: Screening-level exposure estimates and risk calculation;
- Step 3: Problem formulation;
- Step 4: Study design and data quality objective (DQO) process;
- Step 5: Field sampling plan and verification of study design;
- Step 6: Site Investigation and data analysis;
- Step 7: Risk characterization; and



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Step 8: Risk management.

Steps 1 and 2 encompass the screening-level ecological risk assessment (SLERA), while the remaining steps constitute the baseline ecological risk assessment (BERA). A decision is made based on the outcome of the SLERA (*i.e.*, the end of Step 2) whether the Site warrants additional ecological evaluation in the form of a BERA. If after Step 2 risks are determined to be minimal, no further evaluation is required; if otherwise, the assessment proceeds to a BERA. While the SLERA is typically a desktop evaluation, the BERA could include collecting additional data and refining conservative estimates to be more realistic and more site-specific.

5.2 Approach to the SLERA

The SLERA will be conducted according to USEPA guidance (USEPA, 2008) for groundwater at the Site using the data collected as part of this Work Plan, as well as relevant surface water and sediment data collected from Indian Ridge Marsh (**Appendix D**). The SLERA will evaluate whether constituents in groundwater that may be emanating from the Site pose potential risk to other environmental media (*i.e.*, surface water and sediment) and ecological receptors in Indian Ridge Marsh. Results of the SLERA will determine whether additional ecological evaluation is warranted in the form of a BERA. Should potential risks indicate that additional evaluation is necessary, conservative risk parameters used to estimate potential risks in the SLERA will be refined using more site-specific and realistic estimates.

The following sections outline the approach that will be followed for the SLERA, including the ecological problem formulation, analysis, and ecological risk characterization.

5.2.1 Step 1: Screening-Level Problem Formulation and Toxicity Evaluation

The first step in the SLERA is the problem formulation, which presents the environmental setting, identifies the constituents of potential ecological concern (COPECs), and develops a CSM. The CSM identifies the media impacted by Siterelated constituents and identifies potential exposure pathways and ecological receptors. To identify COPECs, maximum concentrations of constituents in groundwater venting from LCCS to Indian Ridge Marsh will be compared to Illinois' Numeric and Derived Water Quality Standards (35 IAC 302.208, 302.210, 302.407-302.410) for the protection of aquatic resources and other appropriate ecological benchmarks. If COPECs are identified in venting groundwater, additional investigation



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of surface water and sediment in Indian Ridge Marsh may be needed in order to determine representative concentrations and EPCs of COPECs in those media.

Because it is not feasible to evaluate the relationship of COPECs to every species at the Site, specific receptors are selected to represent the organisms that could be present most frequently or are likely to be sensitive to the effects of Site-related COPECs. Selection criteria include the following factors:

- The occurrence of potentially complete pathways for exposure of ecological resources to chemicals in environmental media;
- Resident communities or species exposed to the highest concentrations of COPECs in environmental media;
- Species or functional groups considered to be essential to, or indicative of, the normal functioning of the affected habitat;
- Species of special status or designation (e.g., threatened or endangered) by State or Federal entities; and
- The feasibility of completing a quantitative assessment for the identified pathways and receptors.

Receptor groups identified for evaluation will be linked to assessment and measurement endpoints. Assessment endpoints are explicit expressions of the actual environmental values (*i.e.*, ecological resources) that are to be protected at the Site (USEPA 1997b). Valuable ecological resources, which include endangered species, are those resources that if adversely affected could impair overall ecosystem function from either a biological or social perspective. Appropriate selection and definition of assessment endpoints is critical to the utility of an ERA because they focus the risk assessment design and analysis. Assessment endpoints are generally populations, communities, or trophic guilds (*e.g.*, insectivorous birds). Populations or trophic guilds may be deemed at risk if reproduction or survival of individuals is determined to be significantly impacted. The general types of effects of concern include the following:

 Mortality, growth, or reproductive effects resulting from direct exposure to contaminants that affect a significant proportion of a receptor population;



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- Mortality, growth, or reproductive effects resulting from exposure to constituents that have bioaccumulated in the ecological food chain that affect a significant proportion of a (higher trophic level) receptor population; and
- Indirect effects associated with a substantial reduction in abundance of prey populations.

Measurement endpoints are quantifiable ecological characteristics, through laboratory or field experimentation, that are related to the valued characteristic chosen as the assessment endpoint (USEPA 1992c, 1998a). Types of measurement endpoints used in the ecological risk assessment process generally fall into three categories: 1) comparison of estimated or measured exposure levels of COPECs to levels known to cause adverse effects, 2) bioassay testing of Site media, and 3) comparison of observed population- and community-level effects in areas downstream of the source area with those observed at background or reference areas.

Potential receptors that will be evaluated for the Site are aquatic organisms, such as fish and amphibians that could be directly exposed to groundwater emanating from the Site and entering Indian Ridge Marsh. In addition, benthic invertebrates within marsh sediments have the potential to be exposed to constituents in groundwater that emerges in marsh sediments as pore water. Finally, upper-trophic level wildlife, such as birds and semi-aquatic mammals, also have the potential to be exposed to constituents entering into the marsh via groundwater from both food and water ingestion.

5.2.2 Step 2: Screening-Level Exposure Estimates and Risk Calculation

COPECs identified in the problem formulation will be carried through the analysis phase of the SLERA. Here ecological receptors identified in the problem formulation and CSM will be evaluated for potential adverse effects from COPECs identified in groundwater emanating from the Site and venting to Indian Ridge Marsh. The analysis phase consists of the exposure assessment and the effects assessment. The exposure assessment estimates the dose of each COPEC to which the identified receptors are exposed. The ecological effects assessment describes the potential adverse effects associated with the identified COPECs to ecological receptors, and reflects the type of assessment endpoints selected. For the effects assessment, ecological benchmarks and wildlife toxicity reference values (TRVs) are selected. Potential adverse effects to ecological receptors are considered possible if hazard quotients exceed a value of 1.



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As with all risk assessments, an acceptable level of uncertainty exists. Uncertainties that may impact the results of the SLERA will be quantified to the extent practicable and described in a qualitative evaluation of uncertainties and the perspective of whether the potential risks may be over- or under-estimated.

In addition, a decision is made as to whether the Site poses potentially unacceptable ecological risks. Because the goal of the SLERA is to conduct a conservative evaluation of potential risks to ecological receptors by incorporating upper-bound estimates of potential effects and exposure, hazard quotients greater than 1 are not considered an absolute indication of risk, but only that the potential for adverse effects exists. If the results indicate no potential risks, the evaluation ends here; otherwise additional ecological evaluation is recommended in a BERA.

5.3 Baseline Ecological Risk Assessment

If the SLERA determines that additional ecological risk evaluations are warranted, Step 3 uses the results of the SLERA to refine the Problem Formulation. The scope and objectives of further investigations needed to complete the BERA are defined in Steps 4 and 5. The investigation work plan developed in Steps 4 and 5 is implemented in Step 6. In this case, if COPECs above screening levels are identified in venting groundwater, additional investigation of surface water, sediment, and possibly biota in Indian Ridge Marsh would be needed to complete the BERA. Step 7 uses the supplemental data from this investigation along with RI data and prior sampling data to characterize risk. Step 8 comprises the evaluation and decision making based on the risk characterization.

6. Remedial Investigation Report

At the conclusion of the Site characterization activities and risk assessments, a comprehensive RI Report will be prepared to present and evaluate the existing and supplemental Site characterization data collected under this RI/FS Work Plan and the BHHRA and ERA. The RI Report will be prepared in accordance with USEPA *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA 1988b) and other appropriate RI/FS guidance. The RI Report will include a summary of available historical data, a discussion of the RI site characterization activities outlined in **Section 3** of this RI/FS Work Plan, and the results of the RI activities, BHHRA, and ERA. Additional details regarding the BHHRA and ERA components are provided below.



7. Treatability Studies

No treatability studies are proposed in this Work Plan, and as such there are currently no data requirements for treatability studies at this time. If USEPA or the LCCS Group determines that treatability testing is necessary, such testing will be conducted as described in Task 5 of the SOW.

8. Feasibility Study Report

In accordance with the requirements of CERCLA and the National Oil and Hazardous Substances Contingency Plan (NCP), the FS involves a process of identifying and screening available response actions and technologies to develop remedial alternatives that meet the Superfund program goal (40 CFR 300.430(a)(1)(i)) and achieve, to the extent practicable, the Superfund program expectations for identifying and selection remedial alternatives (40 CFR 300.430(a)(1)(iii)). The FS will be based on the results of the RI, which will provide the physical, chemical, and biological data to characterize groundwater entering the Site, at the Site, and emanating from the Site, and to prepare the BHHRA and ERA.

The format and content of the FS Report will be in accordance with the USEPA "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (1988b) and other relevant USEPA guidance. The FS Report will provide the evaluation of ARARs, including identification of potential ARARs, descriptions of how ARARs could be applied at the Site, and discussion of Site conditions that may give rise to an ARAR waiver. The FS will develop RAOs and, where applicable, derives PRGs needed to satisfy RAOs.

Remedial alternatives will be developed by first identifying general response actions and the locations and quantities of affected media to which the general response actions may apply. Remedial technologies and process options will be screened and those surviving screening will be assembled to formulate remedial action alternatives. Assembled remedial alternatives will be evaluated, both individually and comparatively, using the criteria and methodology specified in the NCP.

The FS Report will also provide information necessary for the USEPA to prepare relevant sections of the ROD for the Site. The information required is outlined in Chapters 6 and 9 of USEPA's A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents (USEPA 1999).



9. Project Organization and Schedule

The section describes project organization, responsibilities of the project team, progress reports, and schedule. The LCCS Group will select a qualified environmental consultant to conduct the RI/FS and, in accordance with Section VIII of the Settlement Agreement, all RI/FS activities will be under the direction and supervision of qualified personnel. The LCCS Group will notify USEPA in writing of the names, titles, and qualifications of the personnel, including contractors, subcontractors, consultants, and laboratories to be used in this project.

9.1 Project Organization and Project Team

The organizational structure of the project is shown on **Figure 8** and is as follows:

<u>USEPA Project Coordinator</u>: Shari Kolak of the Superfund Division, Region 5 is the designated USEPA Project Coordinator. The USEPA Project Coordinator also has the authority of the Remedial Project Manager (RPM) and On-Scene Coordinator (OSC) as provided by the NCP.

<u>Technical Project Coordinator</u>: Leo M. Brausch will serve as the Technical Project Coordinator for the LCCS Group. Mr. Brausch will be the primary technical point-of-contact for the USEPA Project Coordinator and will direct the efforts of the RI/FS consultant.

<u>RI/FS Consultant</u>: ARCADIS U.S., Inc. The following key personnel will be responsible for the direction and management of the RI/FS activities:

RI/FS Consultant Project Manager: Jack Kratzmeyer

- Management of project team;
- Meetings with Site Group and USEPA;
- Coordination of technical task leaders:
- Data evaluation;
- Preparation and review of Work Plan and related plans; and
- Technical representation of project activities.



Technical Task Managers

The technical task leaders are responsible for the task-specific aspects of the RI/FS Work Plan and related plans. The task leaders report to the project manager.

9.2 Progress Reports

In accordance with Task 8 of the SOW, monthly progress reports will be submitted to USEPA beginning 30 days after the effective date of the Settlement Agreement during periods of active field activities. The monthly progress reports will be submitted by the 15th day of each month. These reports will include the following information:

- A description of the specific work that was performed during the reporting period;
- Paper and electronic copies of analytical laboratory data summaries for any analytical data reports received during the reporting period (the progress report will note that the data are un-reviewed and un-validated and therefore considered to be preliminary);
- A description of any modifications to procedures outlined in the RI/FS Work Plan, the Field Sampling Plan, the Quality Assurance Project Plan, or Health and Safety Plan along with the justification for the modifications;
- A description and schedule for the work planned for the next reporting period; and
- A description of all problems encountered, any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays.

Also in accordance with Task 8 of the SOW, annual progress reports will be submitted to USEPA, with a copy to IEPA, beginning one year after the effective date of the Settlement Agreement. The annual progress reports will summarize the overall progress of the work at the Site and will continue until the termination of the Settlement Agreement, unless otherwise directed in writing by USEPA.

9.3 Schedule

The proposed schedule for tasks associated with the RI/FS is outlined below based on the milestones specified in the SOW.



August 2015

RI/FS Planning Documents, including Work Plan, FSP, QAPP, and HASP: Draft RI/FS planning documents were submitted to USEPA for review in July 2015. Final RI/FS planning documents are due 30 days after USEPA notification of any deficiencies.

<u>RI Report:</u> The RI Report, including the HHRA and BERA, is due 120 calendar days following the receipt of analytical data after completion of the last field sampling event under the RI/FS Work Plan and FSP. The Final RI Report is due 30 days after USEPA's notification of any deficiencies.

<u>Candidate Technologies and Testing Needs Technical Memorandum</u>: If USEPA determines it to be necessary, this memorandum is due within 60 days of request.

<u>Draft and Final Treatability Testing Work Plan and SAP or Amendments to the Original RI/FS Work Plan, FSP, and/or QAPP</u>: If USEPA determines them to be necessary, these draft reports are due within 60 days of request, and final reports are due 30 days after receipt of USEPA's notification of any deficiencies.

<u>Draft and Final Treatability Testing HASP or Amendment to the Original HASP</u>: If USEPA determines it to be necessary, the draft HASP is due within 30 days of request, and the final HASP is due 30 days after receipt of USEPA's notification of any deficiencies.

<u>Draft and Final Treatability Study Evaluation Report</u>: The Draft Treatability Study Evaluation Report is due with the Site Characterization Technical Memorandum, the RI Report, or as approved by USEPA in the Work Plan/FSP. The Final Treatability Study Evaluation Report is due 30 days after receipt of USEPA's notification of any deficiencies.

<u>Remedial Action Objectives Technical Memorandum</u>: This memorandum is due with the draft RI Report.

<u>Alternatives Screening Technical Memorandum</u>: This memorandum is due 30 days after receipt of USEPA's comments on the Remedial Action Objectives Technical Memorandum.

<u>Comparative Analysis of Alternatives Technical Memorandum</u>: This memorandum is due 30 days after receipt of USEPA's comments on the Alternatives Screening Technical Memorandum.





<u>FS Report</u>: The Draft FS Report, including RAOs and Comparative of Analysis Alternatives, is due 30 days after receipt of USEPA's comments on the Comparative Analysis of Alternatives Technical Memorandum. The Final FS Report is due 30 days after USEPA's notification of any deficiencies.

<u>Monthly Progress Reports</u>: Monthly progress reports will be submitted to the USEPA by the 15th day of each month beginning 30 days after the effective date of the Settlement Agreement.

<u>Annual Progress Reports</u>: Annual progress reports will be submitted to the USEPA beginning one year after the effective date of the Settlement Agreement.

Figure 9 lays out the proposed RI/FS schedule based on these milestones.



August 2015

10. References

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Tables

Table 1. Previously Installed Monitoring Well Construction Information Lake Calumet Cluster Site, Chicago, Illinois

MW ID	Install Date	Well Location	Depth of Completion (ft bgs)	Upper (ft bgs)	Lower (ft bgs)	Screened Unit Classification
LC01	22-Apr-99	N of Paxton I	16	5	15	Shallow Fill
LC02	23-Apr-99	N of US Drum	16	4	14	Shallow Sand/Silt Clay
LC03	23-Apr-99	N of US Drum	15	4.5	14.5	Shallow Fill
LC04	21-Apr-99	US Drum	16	5	15	Shallow Fill
LC-05	26-Apr-99	US Drum	16	5	15	Shallow Fill
LC06	26-Apr-99	US Drum	15	5	15	Shallow Fill
LC07	21-Apr-99	Alburn	14	4	14	Shallow Fill
LC09	20-Apr-99	Alburn	20	15	20	Shallow Fill
LC10	20-Apr-99	Alburn	15	5	15	Shallow Fill
LC11	19-Apr-99	US Drum	20	14	19	Shallow Sand/Silt Clay
LC12	20-Apr-99	US Drum	15	5	15	Shallow Sand/Silt Clay
LC13	21-Apr-99	Unnamed Parcel	16	5	15	Shallow Fill
P01	02-Oct-90	Alburn	20.5	10.4	19.8	Shallow Fill
P02	03-Oct-90	Alburn	20.5	10.5	20	Shallow Fill
P03	04-Oct-90	Alburn	24.5	14.9	23.9	Shallow Fill
P04	05-Oct-90	Alburn	20.5	10.0	19.6	Shallow Sand/Silt Clay
P05		Alburn				No Boring Log
G21S		US Drum				No Boring Log
G21D		US Drum				No Boring Log
G22D		Alburn	48			Lower Sand
G26D		N of US Drum	40			Lower Sand
G130B		N of Alburn	118			Bedrock

Notes:

--- No data available ft bgs Feet below ground surface

Table 2. Analytical Methods, Sample Containers, Preservatives, and Holding Time Requirements Lake Calumet Cluster Site, Chicago, Illinois

One we describe A we have be	A so the stand A A a stand	Operatories	Dan and the	Maximum
Groundwater Analysis	Analytical Method	Container	Preservative	Holding Time
Analytical Suite				
TCL Volatile Organic Compounds	SW-846 Method 8260	3 x 40 mL Glass	Hydrochloric acid, cool to 4°C	14 Days
TCL Semi-Volatile Organic Compounds	SW-846 Method 8270	2 x 1 L Amber Glass	Cool to 4°C	7 Days
TCL Polychlorinated Biphenyls	SW-846 Method 8082	2 x 1 L Amber Glass	Cool to 4°C	7 Days
TCL Pesticides	SW-846 Method 8081	2 x 1 L Amber Glass	Cool to 4°C	7 Days
Total TAL Metals	SW-846 Method 6020	500 mL Plastic	Nitric acid, cool to 4°C	6 Months
Dissolved TAL Metals (field filtered)	SW-846 Method 6020	500 mL Plastic	0.25 µm filter, nitric acid, cool to 4°C	6 Months
Ammonia, as Nitrogen	EPA Method 350.1	500 mL Plastic	Sulfuric acid, cool to 4°C	28 Days
Geochemical Characterization Parameters				
Nitrate, as Nitrogen	EPA Method 300.0 / SW-846 Method 9056	500 mL Plastic	Cool to 4°C	2 Days
Nitrite, as Nitrogen	EPA Method 300.0 / SW-846 Method 9056	500 mL Plastic	Cool to 4°C	2 Days
Sulfate	EPA Method 300.0	500 mL Plastic	Cool to 4°C	28 Days
Sulfide	EPA Method 376.2	500 mL Plastic	Zinc acetate, cool to 4°C	7 Days
Total Suspended Solids	EPA Method 160.2	500 mL Plastic	Cool to 4°C	7 Days
Total Organic Carbon	EPA Method 415.1	3 x 40 mL Glass	Hydrochloric acid, cool to 4°C	28 Days
Dissolved Gases				
Methane	RSK-175 / AM20GAX	3 x 40 mL Glass	Cool to 4°C	14 Days
Carbon Dioxide	RSK-175 / AM20GAX	3 x 40 mL Glass	Cool to 4°C	14 Days
Oxygen	RSK-175 / AM20GAX	3 x 40 mL Glass	Cool to 4°C	14 Days
Nitrogen	RSK-175 / AM20GAX	3 x 40 mL Glass	Cool to 4°C	14 Days

Notes:

TAL - target analyte list

TCL - target compound list

L - liter

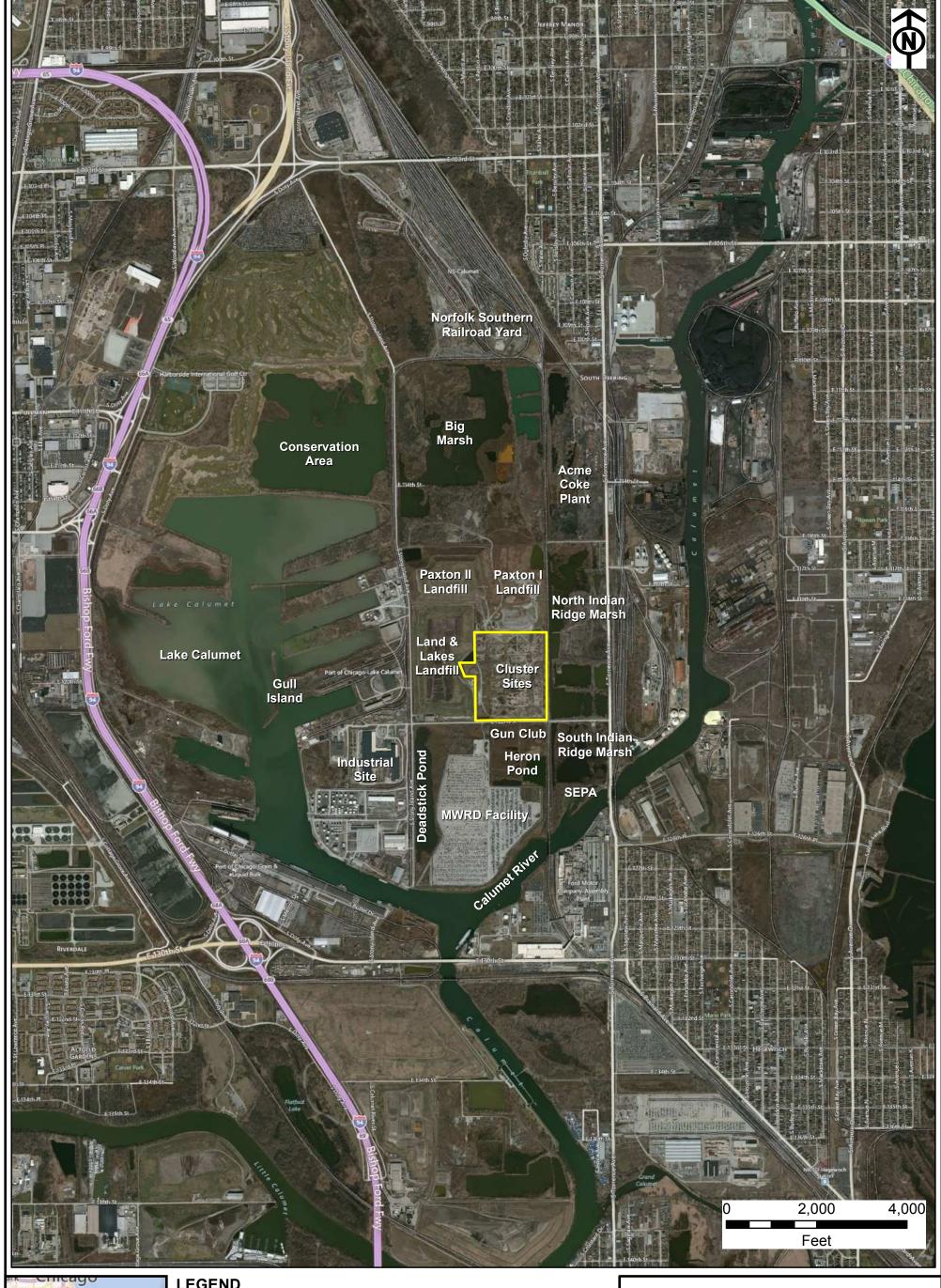
mL - milliliter

µm - micron

°C - degrees Celsius



Figures





LEGEND

LAKE CALUMET CLUSTER SITE BOUNDARY

Notes.

Bing Roads Base Image Source: ArcGIS Online
Services, Access date: 12/13/2012, via ArcGIS v. 10.

This image is not for re-sale or distribution outside
of the use of this PDF.

LAKE CALUMET CLUSTER SITE **CHICAGO, ILLINOIS**

SITE LOCATION









Legend

LAKE CALUMET CLUSTER SITE BOUNDARY

Bing Roads Base Image Source: ArcGIS Online Services, Access date: 12/13/2012, via ArcGIS v. 10. This image is not for re-sale or distribution outside of the use of this PDF.

LAKE CALUMET CLUSTER SITE **CHICAGO, ILLINOIS**

SITE PLAN





Cicero SITE **LOCATION** rove Burbank Oak Lawn Blue Island Wolf Lake Park 83 Calumet City Gary Hammond ley Park 43 Highland Chicago Heights

LEGEND

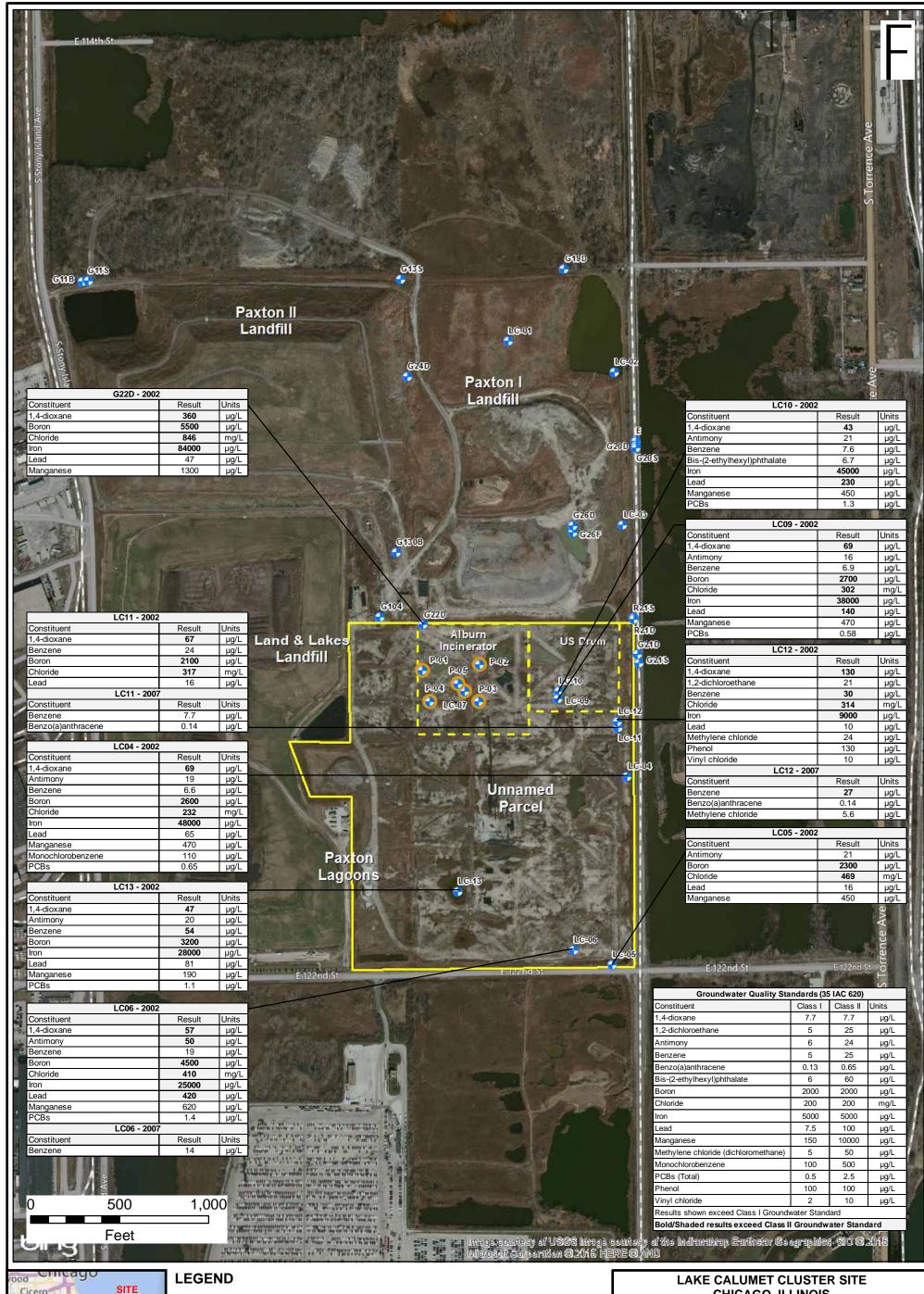
MONITORING WELL

LAKE CALUMET CLUSTER SITE BOUNDARY

Notes: -All sampling locations are estimated based on Previously published reports
-Bing Roads Base Image Source: ArcGIS Online
Services, Access date: 12/14/2012, via ArcGIS v. 10.
This image is not for re-sale or distribution outside of
the use of this PDF. LAKE CALUMET CLUSTER SITE **CHICAGO, ILLINOIS**

PREVIOUS GROUNDWATER **SAMPLING LOCATIONS**





SITE Cicero **LOCATION** urbank Oak Lawn Blue Island Park 🔠 Calumet City Gar Hammond ley Park ு த்இE © Żorijsand ஆசிஞ்orporation Me UQ Micros

MONITORING WELL

-All sampling locations are estimated based on previously published reports.
-µg/L = micrograms per liter

mg/L = milligrams per liter

-Metals results are from unfiltered samples, i.e., Total Metals.
-Data collected by Illinois

Environmental Protection Agency

(IEPA) in 2002 and Ecology and Environment, Inc. (E&E) in 2007

MONITORING WELL - NOT MONITORED

LAKE CALUMET CLUSTER SITE BOUNDARY

-Bing Roads Base Image Source: ArcGIS Online Services, Access date: 7/29/2015 via ArcGIS v 10 This image is not for re-sale or distribution outside of the use of this PDF.

CHICAGO, ILLINOIS

SUMMARY OF 2002 AND 2007 SITE GROUNDWATER RESULTS EXCEEDING CLASS II **GROUNDWATER REMEDIATION OBJECTIVES**





rove Burbank Oak Lawn Blue Island Wolf Lake Park 83 Calumet City Hammond Gary ley Park 43 Highland Chicago Heights

MONITORING WELL - NOT MONITORED

MONITORING WELL - WITH AMMONIA RESULT < 15 mg/L $\,$

CALUMET CLUSTER SITE BOUNDARY

Notes: -All sampling locations are estimated based on

previously published reports.
This image is not for re-sale or distribution outside of the use of this PDF. -mg/L = milligrams per liter

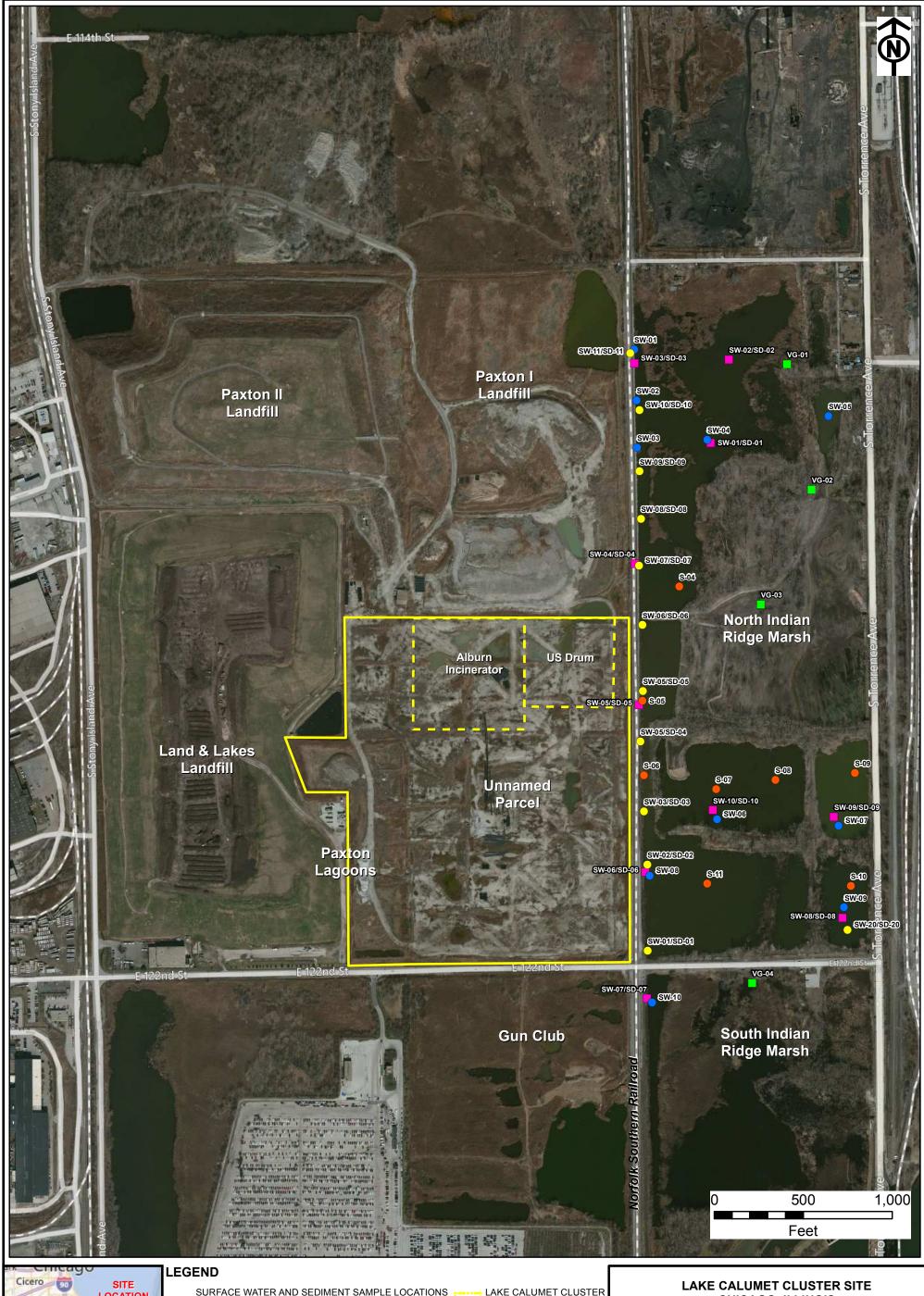
-Tingrams per inter--Concentrations are Total Ammonia as Nitrogen, i.e., Ammonia-N -Data collected by Illinois Environmental Protection Agency (IEPA) in 2002. -IEPA Ammonia water quality standard = 15 mg/L. -Bing Roads Base Image Source: ArcGIS Online Services, Access date: 12/14/2012, via ArcGIS v. 10. This image is not for re-sale or distribution outside of the use of this PDF

CHICAGO, ILLINOIS

SUMMARY OF 2002 SITE GROUNDWATER RESULTS EXCEEDING IEPA AMMONIA WATER QUALITY STANDARD



5





- SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS COLLECTED BY ECOLOGY AND ENVIRONMENT (1999)
- SURFACE WATER SAMPLE LOCATIONS COLLECTED BY
- HARZA ENGINEERING (2001) SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS
 - COLLECTED BY MWH (2002)
 - SURFACE WATER WATER, SEDIMENT, AND TOXICITY BIOASSAY SAMPLE LOCATIONS COLLECTED BY TETRA TECH (2009)
- VEGETATIVE SAMPLE LOCATIONS COLLECTED BY TETRA TECH (2009)

-All sampling locations are estimated based on previously published reports.
-Bing Roads Base Image Source: ArcGIS Online
Services, Access date: 12/13/2012, via ArcGIS v. 10. This image is not for re-sale or distribution outside of the use of this PDF.

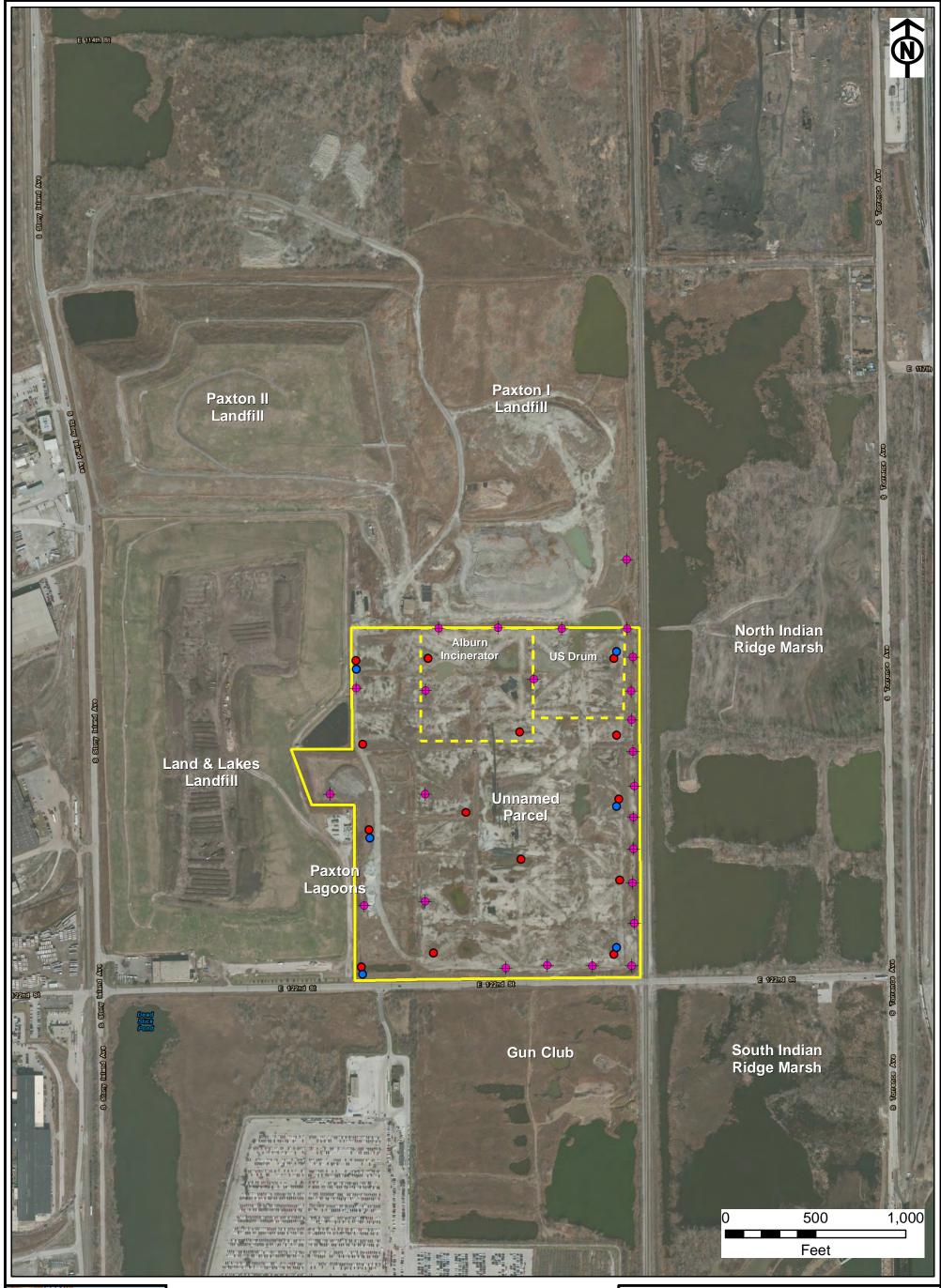
SITE BOUNDARY

LAKE CALUMET CLUSTER SITE **CHICAGO, ILLINOIS**

PREVIOUS SURFACE WATER, SEDIMENT, AND VEGETATIVE SAMPLING LOCATIONS IN INDIAN RIDGE MARSH







SITE **LOCATION** 294 57 Gar

LEGEND

PROPOSED SHALLOW PIEZOMETER

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013 Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom

- PROPOSED DEEP PIEZOMETER
- PROPOSED HPT/VAP LOCATION

LAKE CALUMET CLUSTER SITE BOUNDARY

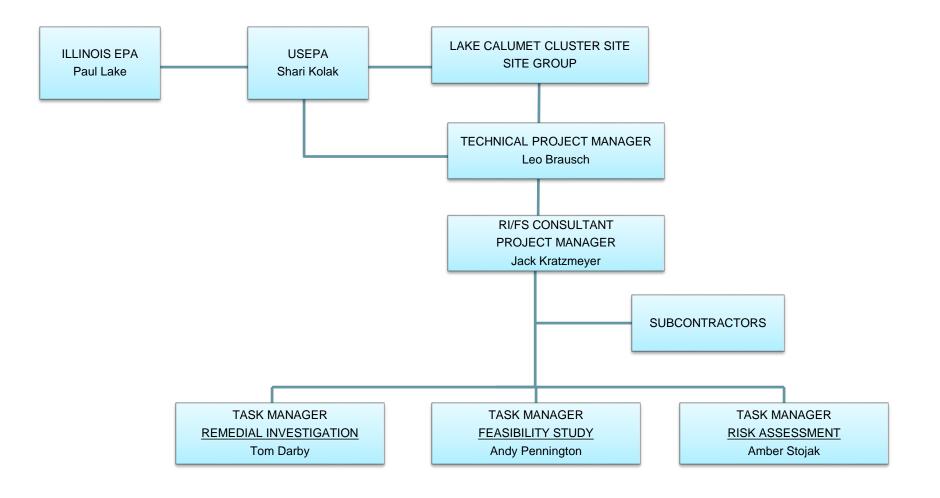
PROPOSED PIEZOMETER AND **HPT/VAP BORING LOCATIONS**

LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS







RI/FS PROJECT ORGANIZATION LAKE CALUMET CLUSTER SITE



Figure 9. RI/FS Project Schedule **Lake Calumet Cluster Site** Qtr 3, 2016 Task Name Start Finish Qtr 2, 2015 Qtr 3, 2015 Qtr 4, 2015 Qtr 1, 2016 Qtr 2, 2016 Qtr 4, 2016 Qtr 1, 2017 Qtr 2, 201 Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar 1 Remedial Investigation / Feasibility Study Wed 2/11/15 Mon 3/27/17 TASK 1 - PROJECT SCOPING AND RI/FS PLANNING Wed 2/11/15 Fri 9/11/15 2/11 Received Comments on Dec. 17, 2012 OU2 RI/FS Work Wed 2/11/15 Wed 2/11/15 Plan (WP) 3/26 Conference Call with USEPA and IEPA to Discuss Thu 3/26/15 Thu 3/26/15 Comments on WP **4/16** Conference Call with USEPA and IEPA to Discuss Thu 4/16/15 Thu 4/16/15 Comments on WP ARCADIS Submits Response to Comments (RTC) on WP Fri 4/17/15 Thu 5/7/15 to Agency 7 Agency Response to RTC on WP Fri 5/8/15 Mon 7/6/15 Conference Call with USEPA and IEPA to Discuss Thu 7/2/15 Thu 7/2/15 Agency Response to RTC on WP 9 Prepare FSP, QAPP, and HASP Tue 7/7/15 Fri 7/17/15 10 Agency Review of FSP, QAPP, and HASP Mon 7/20/15 Fri 9/11/15 11 Submit Revised WP to Agency Tue 7/7/15 Thu 8/20/15 12 Fri 8/21/15 Fri 9/11/15 Agency Review and Approval of Revised WP and Supporting Plans 13 **TASK 2 - COMMUNITY RELATIONS SUPPORT** 14 **TASK 3 - SITE CHARACTERIZATION** Mon 8/31/15 Fri 5/20/16 15 Mon 8/31/15 Fri 9/11/15 Pre-Investigation Planning 16 Phase 1 - Piezometer Installation Mon 9/14/15 Fri 10/16/15 17 Install Piezometers Mon 9/14/15 Fri 9/25/15 18 Data Collection (Water Levels) Mon 9/28/15 Mon 10/12/15 19 Mon 10/12/15 Fri 10/16/15 Finalize Layout for HPT/VAP Transects 20 Phase 2 - HPT Transects/VAP Mon 10/19/15 Fri 1/29/16 21 **HPT Transects and Initial VAP** Mon 10/19/15 Fri 10/30/15 22 Data Collection and Evaluation Mon 11/2/15 Fri 11/13/15 23 Complete VAP Mon 11/16/15 Fri 12/4/15 24 Laboratory Analysis Mon 12/7/15 Fri 12/18/15 25 Data Evaluation Mon 12/21/15 Fri 1/29/16 26 Phase 3 - Monitoring Well Installation Mon 3/7/16 Fri 5/20/16 27 Well Installation Mon 3/7/16 Fri 3/25/16 28 Well Development Mon 3/28/16 Fri 4/1/16 29 Mon 4/4/16 Fri 4/15/16 **Groundwater Sampling** 30 Laboratory Analysis Mon 4/18/16 Fri 4/29/16 31 Data Validation Mon 5/9/16 Fri 5/20/16 32 **TASK 4 - RI REPORTING** Mon 5/23/16 Fri 11/18/16 33 Prepare and Submit Draft RI, SLERA, HHRA Report Mon 5/23/16 Tue 9/20/16 34 Wed 9/21/16 Fri 10/21/16 Agency Review 35 Submit Final RI Report Fri 11/18/16 Fri 11/18/16 36 TASK 5 - TREATABILITY STUDIES (if necessary) 37 TASK 6 - DEVELOP AND SCREEN ALTERNATIVES Mon 5/23/16 Fri 2/24/17 38 Submit Remedial Action Objectives TM to USEPA Mon 5/23/16 Tue 9/20/16 39 Wed 9/21/16 Fri 10/21/16 40 Prepare/Submit Alternatives Screening TM to USEPA Mon 10/24/16 Wed 11/23/16 41 Mon 11/28/16 Fri 12/23/16 42 Prepare/Submit Comparative Analysis TM to USEPA Mon 12/26/16 Wed 1/25/17 43 Thu 1/26/17 Fri 2/24/17 Agency Review 44 **TASK 7 - FEASIBILITY STUDY REPORT** Mon 11/21/16 Mon 3/27/17 45 Prepare/Submit FS Report to USEPA Mon 11/21/16 Mon 3/27/17 46 **TASK 8 - PROGRESS REPORTS** Mon 3/16/15 Tue 11/15/16 47 **Monthly Progress Reports** Mon 3/16/15 Fri 10/14/16 68 11/15 Annual Progress Report Tue 11/15/16 Tue 11/15/16 Task Summary External Milestone Inactive Summary Manual Summary Rollup = Finish-only 3 LCCS - RI/FS Project Schedule

Split Project Summary Manual Task **Manual Summary** Deadline Inactive Task Date: Thu 8/13/15 Milestone External Tasks Inactive Milestone Duration-only Start-only Progress Page 1



Appendix A

Data Validation Reports for 2009 USACE Data from IRM



Indian Ridge Marsh

Data Review

CHICAGO, ILLINOIS

Semivolatiles, Pesticides, PCBs, Metals, AVS/SEM and Miscellaneous Analyses

SDG#C9D090311 and C9F100120

Analyses Performed By: TestAmerica Laboratories Pittsburgh, Pennsylvania

Report: #23445R Review Level: Tier III

Project: CI001805.0001.00001

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # C9D090311 and C9F100120 for samples collected in association with the Indian Ridge Marsh Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

	Sample _					Analysis				
SDG Number	Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	svoc	AVS/ SEM	PEST/ PCB	MET	MISC
	SD-01 04082009	C9D090311001	Sediment	4/8/2009			Х			
	SD-02 04082009	C9D090311002	Sediment	4/8/2009		Х	Х	Х		Х
	SD-03 04082009	C9D090311003	Sediment	4/8/2009			Х			
	SD-04 04082009	C9D090311004	Sediment	4/8/2009			Х			
	SD-05 04082009	C9D090311005	Sediment	4/8/2009			Х			
C9D090311	SD-06 04082009	C9D090311006	Sediment	4/8/2009		Х	Х	Х	Х	Х
C9D090311	SW-01 04082009	C9D090311007	Water	4/8/2009					Х	Х
	SW-02 04082009	C9D090311008	Water	4/8/2009					Х	Х
	SW-03 04082009	C9D090311009	Water	4/8/2009					Х	Х
	SW-04 04082009	C9D090311010	Water	4/8/2009					Х	Х
	SW-05 04082009	C9D090311011	Water	4/8/2009					Х	Х
	SW-06 04082009	C9D090311012	Water	4/8/2009					Х	Х
C9F100120	SD-02 04082009	C9F100120001	Sediment	4/8/2009					Χ	
C9F 100120	SD-06 04082009	C9F100120002	Sediment	4/8/2009					Χ	

Note:

- 1. Miscellaneous analyses for surface waters include Ammonia-Nitrogen and Hardness.
- 2. Miscellaneous analyses for sediment samples include TOC.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

			Reported		mance ptable	Not
	Items Reviewed	No	Yes	No	Yes	Required
1.	Sample receipt condition		Х		Х	
2.	Requested analyses and sample results		Х		Х	
3.	Master tracking list		Х		Х	
4.	Methods of analysis		Х		Х	
5.	Reporting limits		Х		Х	
6.	Sample collection date		Х		Х	
7.	Laboratory sample received date		Х		Х	
8.	Sample preservation verification (as applicable)		Х		Х	
9.	Sample preparation/extraction/analysis dates		Х		Х	
10.	Fully executed Chain-of-Custody (COC) form		Х		Х	
11.	Narrative summary of QA or sample problems provided		Х		Х	
12.	Data Package Completeness and Compliance		Х		Х	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8270C, 8082A and 8081A. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999 and professional judgement.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SEMI-VOLATILE VOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
CW 04C 0270C	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
SW-846 8270C	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. No qualification of the sample results was required.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	tial/Continuing Compound	
SD-02 04082009 SD-06 04082009	CCV % D	2,2'-Oxybis(1-chloropropane)	21.6%
	CCV %D	Atrazine	-25.9%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification	
	RRF <0.05	Non-detect	R	
	KKF <0.05	Detect	J	
Initial and Continuing	RRF <0.01 ¹	Non-detect	R	
Calibration	KKF <0.01	Detect	J	
	RRF >0.05 or RRF >0.01 ¹	Non-detect	No Action	
	KKF >0.03 01 KKF >0.01	Detect	NO ACTION	
	%RSD > 15% or a correlation	Non-detect	UJ	
Initial Calibration	coefficient <0.99	Detect	J	
Illitial Calibration	%RSD >90%	Non-detect	R	
	761(3D >90 %	Detect	J	
	%D >20% (increase in sensitivity)	Non-detect	No Action	
	/// >20 // (Increase in sensitivity)	Detect	J	
Continuing Colibration	9/D > 209/ (degrees in consitivity)	Non-detect	UJ	
Continuing Calibration	%D >20% (decrease in sensitivity)	Detect	J	
	%D >90% (increase/decrease in	Non-detect	R	
	sensitivity)	Detect	J	

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
SD-02 04082009 SD-06 04082009	Hexachloroethene	AC	<ll but="">10%</ll>

AC Acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
the upper central limit (LIL)	Non-detect	No Action
> the upper control limit (UL)	Detect	J
the lower central limit (LL) but > 109/	Non-detect	UJ
< the lower control limit (LL) but > 10%	Detect	J
< 10%	Non-detect	R
< 10%	Detect	J
Parent sample concentration > four times the MS/MSD	Detect	No Action
spiking solution concentration.	Non-detect	INO ACTION

Please note: The MS/MSD was spiked with a subset list of the compounds that were analyzed and reported for client samples. Although not a SW-846 method requirement, the current industry standard is to include all target compounds in the MS/MSD spiking standard. This had no impact on the data usability; therefore, the data were not qualified.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

Please note: The LCS was spiked with a subset list of the compounds that were analyzed and reported for client samples. Although not a SW-846 method requirement, the current industry standard is to include all target compounds in the LCS spiking standard. This had no impact on the data usability; therefore, the data were not qualified.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not included with this SDG.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-02	13.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent solids < 30%	Non-detect	UJ
Fercent solius < 50%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270C	Rep	orted		mance ptable	Not Required
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROME	TRY (GC/	MS)			
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks		Х		Х	
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate(LCSD) %R					Х
LCS/LCSD Precision (RPD)					Х
Matrix Spike (MS) %R		Х		Х	
Matrix Spike Duplicate(MSD) %R		Х	Х		
MS/MSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)					Х
Surrogate Spike Recoveries		Х		Х	
Dilution Factor		Х		Х	
Moisture Content		Х	Х		
Tier III Validation					
System performance and column resolution		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х	Х		
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation		•	•	•	
A.Reconstructed ion chromatograms		Х		Х	
B.Quantitation Reports		Х		Х	
C.RT of sample compounds within the established RT windows		Х		Х	
D.Quantitation transcriptions/calculations		Х		Х	
E.Reporting limits adjusted to reflect sample dilutions %RSD_Relative standard deviation		Х		Х	

%RSD Relative standard deviation %R Percent recovery RPD Relative percent difference

Percent recovery
Relative percent difference
Percent difference

%D

PESTICIDES ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8081	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
377-040 0001	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. System Performance

The instrument performance checks are performed to ensure adequate resolution and instrument sensitivity.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% is allowed or a correlation coefficient greater than 0.99 is allowed.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (15%).

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. pesticide analysis requires that one of the two pesticide surrogate compounds exhibit recoveries within the laboratory-established acceptance limits.

Sample locations associated with surrogates exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Surrogate	Recovery
SD-02	Tetrachloro-m-xylene	D
SD-06	Decachlorobiphenyl	D

Diluted (D)

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results associated with the deviant fraction are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
the upper central limit (LIII.)	Non-detect	No Action
> the upper control limit (UL)	Detect	J
the lower central limit (LL) but > 109/	Non-detect	UJ
< the lower control limit (LL) but > 10%	Detect	J
< 10%	Non-detect	R
< 1076	Detect	J
One surrogate exhibiting recovery outside the control limits	Non-detect	No Action
but > 10%	Detect	NO ACTION
Surrogates diluted below the calibration curve due to the	Non-detect	J ¹
high concentration of a target compound.	Detect	J

A more concentrated analysis was not performed with surrogate compounds within the calibration range; therefore, no determination of extraction efficiency could be made.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The laboratory noted "Due to the concentration of the target compounds detected and/or matrix, the samples were analyzed at a dilution." Since the MS/MSD analysis was performed at a 25-fold dilution, the

matrix spike compounds were diluted out; therefore, the percent recoveries associated with the MS/MSD analysis were not evaluated.

7. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

Please note: The LCS was spiked with a subset list of the compounds that were analyzed and reported for client samples. Although not a SW-846 method requirement, the current industry standard is to include all target compounds in the LCS spiking standard. This had no impact on the data usability; therefore, the data were not qualified.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not included with this SDG.

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the percent difference (%D) of detected sample results must be less than 40%.

The column %D was within control limits for detected all detected compounds.

10. System Performance and Overall Assessment

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-02	13.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Dereent colide : 200/	Non-detect	UJ
Percent solids < 30%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PESTICIDES

Pesticides; SW-846 8081	Rep	orted	ted Performance Acceptable		Not
		Yes	No	Yes	Required
GAS CHROMATOGRAPHY (GC/ECD)					
Tier II Validation					
Holding times		X		Х	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks		Х		Х	
Laboratory Control Sample (LCS)		Х		Х	
Laboratory Control Sample Duplicate(LCSD)		Х		Х	
LCS/LCSD Precision (RPD)		Х		Х	
Matrix Spike (MS)		Х	Х		
Matrix Spike Duplicate(MSD)		Х	Х		
MS/MSD Precision (RPD)		Х	Х		
Field/Lab Duplicate (RPD)					Х
Surrogate Spike Recoveries		Х		Х	
Column %D ≤ 40% (If dual column is performed for reporting-not confirmation)		Х		Х	
Dilution Factor		X		X	
Moisture Content		Х	Х		
Tier III Validation					
Initial calibration %RSDs		Х		Х	
Continuing calibration %Ds		Х		Х	
System performance and column resolution		Х		Х	
Compound identification and quantitation		•		-	
A. Quantitation Reports		Х		Х	
B. RT of sample compounds within the established RT windows		Х		Х	
C. Identification/confirmation		Х		Х	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions %RSD – relative standard deviation %R - percent		Х		Х	

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference.

POLYCHLORINATED BIPHENYLS (PCBs) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8082	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
377-040 0002	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% for each peak is allowed. Multiple-point calibrations were performed for Aroclor 1016 and 1260 only. Single-point calibrations were performed for the remaining Aroclors.

4.2 Continuing Calibration

All peaks associated with the opening continuing calibration standard must exhibit a percent difference (%D) less than the control limit (15%). The closing continuing calibration standard must exhibit a %D less than the control limit (50%)

All Aroclors associated with calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
SD-02 SD-06	CCV %D	Aroclor 1016	26.8%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial Calibration	%RSD > 20%or a correlation coefficient <0.99	Non-detect	UJ
Initial Calibration	76K3D > 20%01 a correlation coefficient <0.99	Detect	J
	%D >15% (increase in sensitivity)	Non-detect	No Action
Continuing	(Increase in sensitivity)	Detect	J
Calibration	0/D = 150/ (degrees in consistivity)	Non-detect	UJ
	%D >15% (decrease in sensitivity)	Detect	J

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. PCB analysis requires the surrogate compounds must exhibited recoveries within the method established acceptance limits.

All surrogate recoveries were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the method established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the method established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited recoveries within the control limits.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the method established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not performed on a sample within this SDG.

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the relative percent difference (%RPD) of detected sample results must be less than 40%.

The dual column analysis exhibited an acceptable %RPD between columns.

10. System Performance and Overall Assessment

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-02	13.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent colide x 200/	Non-detect	UJ
Percent solids < 30%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCBs

PCBs; SW-846 8082	Rep	orted		rmance eptable	Not
		Yes	No	Yes	Required
GAS CHROMATOGRAPHY (GC/ECD)					
Tier II Validation					
Holding times		X		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate(LCSD) %R					Х
LCS/LCSD Precision (RPD)					Х
Matrix Spike (MS) %R		Х		Х	
Matrix Spike Duplicate(MSD) %R		Х		Х	
MS/MSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)					Х
Surrogate Spike Recoveries		Х		Х	
Column (RPD) (If dual column is performed-not confirmation purposes only)		Х		Х	
Dilution Factor		X		Χ	
Moisture Content		Х	Х		
Tier III Validation					
Initial calibration %RSDs		Х		Х	
Continuing calibration %Ds		Х	Х		
System performance and column resolution		Х		Х	
Compound identification and quantitation					1
A. Quantitation Reports		Х		Х	
B. RT of sample compounds within the established RT windows		Х		Х	
C. Pattern identification		X		Х	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions %RSD – relative standard deviation. %R - percent		Х		Х	

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference,

[%]D – difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6020, 7470, 7471, EPA AVS/SEM, 350.1, SM 2340C and Lloyd Kahn. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004 and professional judgement.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).
 - J The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
Soil 180 days from collection to analysis		Cool to <6 °C.	
SW-846 7470	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to <6 °C.

The analyses that exceeded the holding time are presented in the following table.

Sample Locations	Holding Time	Criteria
SD-02 SD-06	64 Days	28 Days

Sample results associated with sample locations analyzed by analytical method Mercury by SW-846 7471 were qualified, as specified in the table below. All other holding times were met.

	Qualification			
Criteria	Detected Analytes	Non-detect Analytes		
Analysis completed less than two times holding time	J	UJ		
Analysis completed greater than two times holding time	J	R		

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the instrument detection limit (IDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
SW-01 SW-02 SW-03 SW-06	Selenium	Detected comple recults DL and DAL	"I ID" of the DI
SW-04 SW-05	Thallium	Detected sample results <rl "ub"="" <bal="" and="" at="" rl<="" td="" the=""><td>"UB" at the RL</td></rl>	"UB" at the RL
SD-06	Beryllium		

RL Reporting limit

The equipment blank contained low concentrations of certain metals; however it was not compared to sediment samples associated with this SDG since the equipment blank was collected on a different day.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD analysis was not performed on a sample location within this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

A laboratory duplicate was not performed on a sample location within this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Field duplicate analysis was not performed on a sample location within this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

A serial dilution analysis was not performed on a sample location within this SDG.

8. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-02	13.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent solids < 30%	Non-detect	UJ
Percent solids < 50%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Repo	orted		rmance ptable	Not		
,	No	Yes	No	Yes	Required		
Inductively Coupled Plasma-Atomic Emission Spec	Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP)						
Atomic Absorption – Manual Cold Vapor (CV)							
Tier II Validation							
Holding Times		Х	Х				
Reporting limits (units)		Х		Х			
Blanks							
A. Instrument Blanks		Х	Х				
B. Method Blanks		Х	Х				
C. Equipment/Field Blanks		Х		Х			
Laboratory Control Sample (LCS)		X		Х			
Matrix Spike (MS) %R					X		
Matrix Spike Duplicate (MSD) %R					X		
MS/MSD Precision (RPD)					X		
Field/Lab Duplicate (RPD)					X		
ICP Serial Dilution					X		
Reporting Limit Verification		Х		Х			
Tier III Validation							
Initial Calibration Verification		Х		Х			
Continuing Calibration Verification		Х		Х			
CRDL Standard		Х		Х			
ICP Interference Check		Х		Х			
Raw Data		Х		Х			
Transcription/calculation errors present		Х		Х			
Reporting limits adjusted to reflect sample dilutions		Х		Х			

%R Percent recovery
RPD Relative percent difference

SIMULTANEOUSLY EXTRACTED METALS (SEM) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA SEM 121/R-91-100	Solid	180 days to analysis 28 days to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the instrument detection limit (IDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the IDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

A MS/MSD analysis was not performed on a sample location within this SDG.

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

A laboratory duplicate was not performed on a sample location within this SDG.

4. Field Duplicate Analysis

The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil and sediment matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the reporting limit (RL), a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil and sediment matrices.

Field duplicate analysis was not performed on a sample location within this SDG.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-01	9.1%
SD-02	13.2%
SD-04	21.9%
SD-05	15.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent colide + 20%	Non-detect	UJ
Percent solids < 30%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SEM

SEM: EPA SEM 121/R-91-100	Rep	orted	Performance Acceptable		Not Required	
		Yes	No	Yes		
Inductively Coupled Plasma-Mass Spectrometry (ICP/MS)						
Tier II Validation						
Holding Times		Х		Х		
Reporting limits (units)		Х		Х		
Blanks						
A. Instrument Blanks		Х		Х		
B. Method Blanks		Х		Х		
C. Equipment/Field Blanks					Х	
Laboratory Control Sample (LCS)		Х		Х		
Laboratory Duplicate Sample		Х		Х		
Matrix Spike (MS) %R					Х	
Matrix Spike Duplicate (MSD) %R					Х	
MS/MSD Precision (RPD)					Х	
Laboratory Duplicate Sample (RPD)					Х	
Field Duplicate Sample (RPD)					Х	
Tier III Validation						
Initial Calibration Verification		Х		Х		
Continuing Calibration Verification		Х		Х		
CRDL Standard		Х		Х		
ICP Interference Check		Х		Х		
Raw Data		Х		Х		
Transcription/calculation errors present		Х		Х		
Reporting limits adjusted to reflect sample dilutions		Х		Х		

%R RPD

Percent recovery
Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total Organic Carbon by EPA Lloyd Kahn	Sediment	28 days from collection to analysis	Cooled @ <6°C.
Hardness by SM2340C	Water	6 months from collection to analysis	Cooled @ <6°C; preserved to a pH of less than 2.
Ammonia-N by EPA 350.1	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
Acid Volatile Sulfide (AVS) by EPA AVS	Sediment	14 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. Therefore, sample results greater than the BAL resulted in the removal of the laboratory qualifier (J). No other qualification of the sample results was required.

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory qualifier "N" will be removed.

A MS/MSD analysis was not performed on a sample location within this SDG.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

The laboratory duplicate sample results exhibited RPD within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

A field duplicate was not performed on a sample within this data set.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

The calculated %solids were acceptable with the exception of the sample location presented in the following table.

Sample Location	%Solids
SD-01	9.1%
SD-02	13.2%
SD-04	21.9%
SD-05	15.2%
SD-06	10.2%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent solids < 30%	Non-detect	ΟJ
Fercent solius < 50%	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: Lloyd Kahn; SM2340C; EPA 350.1; EPA AVS	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	Nequired
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate(LCSD) %R		Х		Х	
LCS/LCSD Precision (RPD)		Х		Х	
Matrix Spike (MS) %R					Х
Matrix Spike Duplicate(MSD) %R					Х
Lab Duplicate (RPD)		Х		Х	
Field Duplicate (RPD)					Х
Dilution Factor		Х		Х	
Moisture Content		Х	Х		
Tier III Validation					
Initial calibration %RSD or correlation coefficient		Х		Х	
Continuing calibration %R		Х		Х	
Raw Data		Х		Х	
Transcription/calculation errors present				Х	
Reporting limits adjusted to reflect sample dilutions		X		X	

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference,

[%]D – difference

VALIDATION PERFORMED

BY: Jeffrey L. Davin

SIGNATURE:

DATE: April 21, 2015

PEER REVIEW: Dennis Capria

DATE: April 23, 2015

CHAIN OF CUSTODY/ CORRECTED SAMPLE ANALYSIS DATA SHEETS

Special Instructions/ Conditions of Receipt Time Chain of Custody Number 094671 (A fee may be assessed if samples are retained Months longer than 1 month) Date 4 9 9 Date Date **TestAmerica** THE LEADER IN ENVIRONMENTAL TESTING Analysis (Attach list if more space is needed) Date 4/8/03 Lab Number メメメマス AVS | SEM PCB| & st SVDC , TOC メメダ メ Archive For OC Requirements (Specify) **NANZ** Containers & Preservatives 🗌 Disposal By Lab HOEN Jack fromas 3. Received By 1. Received By 2. Received By IOH Telephone Number (Area Code)/Fax Number 312 - 29 - 777 Lab Contact EONH Drinking Water? Yes □ No □ ≠OSZH гәлдир Temperature on Receipt ☐ Retum To Client 1900 DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy 110S Sample Disposa Carrier/Waybill Number Matrix line 'P85 Project Manager Site Contact ù√ Other_ ☐ Unknown Time 至5 <u> 8</u> **公**公 1215 **529**| 1515 Date デデ 8 ر ا 🗌 21 Days State Zip Code 418109 Date □ Poison B ☐ 14 Days Sample I.D. No. and Description (Containers for each sample may be combined on one line) Skin Irritant Ollent Tetra Took Emi □ / Days Contract/Purchase Order/Quote No. Custody Record ☐ Non-Hazard ☐ Flammable Possible Hazard Identification Tum Around Time Required Sp-03 50-03 1a-45 NO-05 50-06 50 T 05 5W-02 50 - W SW-05 10-MS 5w-03 SW-Ob Chain of 1. Relinquished By 3. Relinquished By 2. Relinquished By 24 Hours Comments

Client Sample ID: SD-02

GC/MS Semivolatiles

Lot-Sample #: C9D090311-002 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111037	Work Order #: K9WLH1AC Date Received: 04/09/09 Analysis Date: 04/23/09 Analysis Time: 22:04	Matrix: SOLID MS Run #: 9111019
Dilution Factor: 2.5 % Moisture: 87	Initial Wgt/Vol: 30 g Analyst ID: 403801 Method: SW846 8270C	Final Wgt/Vol: 5 mL Instrument ID: 732

Pa Paramere		REPORTI	ЙĞ		
PARAMETER	RESULT	LIMIT	UNITS	MDL	
Acenaphthene	4 70 J	1300	ug/kg	200	
Acenaphthylene	ND J	1300	ug/kg	250	
Acetophenon e	ND J	6300	ug/kg	290	
Anthracene	570 J	1300	ug/kg	220	
Atrazine	ND J	6300	ug/kg	300	
Benzo (a) anthracene	2400	1300	ug/kg	200	
Benzo (a) pyrene	3700	1300	ug/kg	350	
Benzo(b) fluoranthene	6400	1300	ug/kg	260	
Benzo(ghi)perylene	2800	1300	ug/kg	93	
Benzo(k) fluoranthene	2200	1300	ug/kg	260	
Benzaldehyde	ND	6300	ug/kg	170	
1,1'-Biphenyl	ND	6300	ug/kg	290	
bis(2-Chloroethoxy)	ND	6300	ug/kg	250	
methane			37 3	230	
bis(2-Chloroethyl)-	ИD	1300	ug/kg	110	
ether			 5/9	110	
bis(2-Ethylhexyl)	ND	6300	ug/kg	540	
phthalate		7777	ug/ ng	540	
4-Bromophenyl phenyl	ND	6300	ug/kg	270	
ether		3300	ug/ kg	270	
Butyl benzyl phthalate	ND	6300	ug/kg	440	
Caprolactam	ND Y	32000	ug/kg	830	
Carbazole	270 Ј	1300	ug/kg	1 70	
4-Chloroaniline	ND J	6300	ug/kg	200	
4-Chloro-3-methylpheno1	ND	6300	ug/kg	190	
2-Chloronaphth a lene	ND	1300	ug/kg	170	
2-Chlorophenol	ND	6300	ug/kg	190	
4-Chlorophenyl phenyl	ND	6300	ug/kg	280	
ether		0300	dg/ kg	280	
Chrysene	3200 V	1300	ug/kg	220	
Dibenz(a,h)anthracene	790 J	1300	ug/kg ug/kg		
Dibenzofuran	330 J	6300	ug/kg ug/kg	280	
3,3'-Dichlorobenzidine	ND J	6300		210	
2,4-Dichlorophenol	ND	1300	ug/kg ug/kg	1200	
Diethyl phthalate	ND	6300		260	
2,4-Dimethylphenol	ND	6300	ug/kg	360	
Dimethyl phthalate	ND V	6300	ug/kg	270	
_		0.00	ug/kg	210	

(Continued on next page)

Client Sample ID: SD-02

GC/MS Semivolatiles

Lot-Sample #...: C9D090311-002 Work Order #...: K9WLH1AC Matrix..... SOLID

		REPORTI	NG		
PARAMETER	RESULT	LIMIT	UNITS	MDL	
Di-n-butyl phthalate	ND J	6300	ug/kg	350	
4,6-Dinitro-	ND	32000	ug/kg	6100	
2-methylphenol			J. J	0200	
2,4-Dinitrophenol	ND	32000	ug/kg	2000	
2,4-Dinitrotoluene	ND	6300	ug/kg	300	
2,6-Dinitrotoluene	ND	6300	ug/kg	320	
Di-n-octyl phthalate	ND ,	6300	ug/kg	160	
Fluoranthene	3100 [¥]	1300	ug/kg	110	
Fluorene	400 J	1300	ug/kg	190	
Hexachlorobenzene	ND J	1300	ug/kg	240	
Hexachlorobutadiene	ND	1300	ug/kg	270	
Hexachlorocyclopenta-	ND	6300	ug/kg	240	
diene			ug/ xg	240	
Hexachloroethane	ND	6300	ug/kg	210	
Indeno(1,2,3-cd)pyrene	2100	1300	ug/kg	210	
Isophorone	$_{ exttt{ND}}$ \forall	6300	ug/kg ug/kg	70	
2-Methylnaphthalene	610 Ј	1300	ug/kg ug/kg	250	
2-Methylphenol	ND J	6300	ug/kg ug/kg	250	
4-Methylphenol	ND J	6300		230	
Naphthalene	900 J	1300	ug/kg	280	
2-Nitroaniline	ND J	32000	u g/kg	180	
3-Nitroaniline	ND	32000	ug/kg	390	
4-Nitroaniline	ND	32000	ug/kg	210	
Nitrobenzene	ND	1300	ug/kg	310	
2-Nitrophenol	ND	6300	ug/kg	320	
4~Nitrophenol	ND	32000	ug/kg	240	
N-Nitrosodi-n-propyl-	ND		ug/kg	3700	
amine	112	1300	ug/kg	350	
N-Nitrosodiphenylamine	ND	1300	/1		
2,2'-oxybis	ND		ug/kg	260	
(1-Chloropropane)	112	1300	ug/kg	280	
Pentachlorophenol	ND	6200	4-		
Phenanthrene	2100	6300	ug/kg	1100	
Phenol	ND	1300	ug/kg	150	
Pyrene	3100	1300	ug/kg	250	
2,4,5-Trichloro-		1300	ug/kg	340	
phenol	ND	6300	$\mathtt{ug/kg}$	160	
2,4,6-Trichloro-	NTD.				
phenol	ND V	6300	ug/kg	320	
F					

(Continued on next page)

Client Sample ID: SD-02

GC/MS Semivolatiles

Lot-Sample #...: C9D090311-002 Work Order #...: K9WLH1AC Matrix.....: SOLID

J Estimated result. Result is less than RL.

Client Sample ID: SD-06

GC/MS Semivolatiles

Lot-Sample #: C9D09031 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111037	Date Received .: 04/09/09	Matrix: SOLID MS Run #: 9111019
Dilution Factor: 2.5 % Moisture: 90	Initial Wgt/Vol: 30 g Analyst ID: 403801 Method: SW846 82700	Final Wgt/Vol: 5 mL Instrument ID: 732

		REPORTII	NG		
PARAMETER	RESULT	LIMIT	UNITS	\mathtt{MDL}	
Acenaphthene	ND J	1600	ug/kg	260	-
Acenaphthylene	ND	1600	ug/kg	330	
Acetophenone	ND	8100	ug/kg	380	
Anthracene	ND	1600	ug/kg	290	
Atrazine	$_{ m ND}$ $_{ m V}$	8100	ug/kg	390	
Benzo (a) anthracene	640 J	1600	ug/kg	260	
Benzo (a) pyrene	5 90 J	1600	ug/kg	460	
Benzo(b)fluoranthene	5800 	1600	ug/kg	330	
Benzo(ghi)perylene	500 J	1600	ug/kg	120	
Benzo(k) fluoranthene	510 J	1600	ug/kg	340	
Benzaldehyde	ND J	8100	ug/kg		
1,1'-Biphenyl	ND I	8100	ug/kg ug/kg	210	
bis(2-Chloroethoxy)	ND	8100		370	
methane	5.2	0100	ug/kg	330	
bis(2-Chloroethyl)-	ND	1600	(1		
ether		1600	ug/kg	140	
bis(2-Ethylhexyl)	ND	8100	/3		
phthalate	11.5	9100	ug/kg	690	
4-Bromophenyl phenyl	ND	0100	4.		
ether	ND	8100	ug/kg	350	
Butyl benzyl phthalate	ND	0100			
Caprolactam	ND	8100	ug/kg	570	
Carbazole	ND	42000	ug/kg	1100	
4-Chloroaniline	ND	1600	ug/kg	220	
4-Chloro-3-methylphenol	ND	8100	ug/kg	250	
2-Chloronaphthalene	ND ND	8100	ug/kg	240	
2-Chlorophenol	ND	1600	ug/kg	220	
4-Chlorophenyl phenyl	V	8100	ug/kg	250	
ether	ND '	8100	ug/kg	360	
Chrysene	CEA -				
Dibenz (a, h) anthracene	650 J	1600	ug/kg	290	
Dibenzofuran	ND J	1600	ug/kg	360	
3,3'-Dichlorobenzidine	ND	8100	ug/kg	280	
2,4-Dichlorophenol	ND	8100	ug/kg	1500	
-	ND V	1600	ug/kg	330	
Diethyl phthalate	500 J	8100	ug/kg	460	
2,4-Dimethylphenol	ND	8100	ug/kg	340	
Dimethyl phthalate	ND _J	8100	ug/kg	280	
			-		

(Continued on next page)

Client Sample ID: SD-06

GC/MS Semivolatiles

Lot-Sample #...: C9D090311-006 Work Order #...: K9WLM1AC Matrix.....: SOLID

		REPORTI	NG		
PARAMETER	RESULT	LIMIT	UNITS	MDL	
Di-n-butyl phthalate	ND J	8100	ug/kg	460	
4,6-Dinitro-	ND	42000	ug/kg	7900	
2-methylphenol			5,5	, 200	
2,4-Dinitrophenol	ND	42000	ug/kg	2600	
2,4~Dinitrotoluene	ND	8100	ug/kg	380	
2,6-Dinitrotoluene	ND	8100	ug/kg	420	
Di-n-octyl phthalate	ND V	8100	ug/kg	210	
Fluoranthene	900 Ј	1600	ug/kg	140	
Fluorene	ND J	1600	ug/kg	250	
Hexachlorobenzene	ND	1600	ug/kg	310	
Hexachlorobutadiene	ND	1600	ug/kg	350	
Hexachlorocyclopenta-	ND	8100	ug/kg	310	
diene		0100	ug/ ng	310	
Hexachloroethane	$_{ exttt{ND}}$ \forall	8100	ug/kg	280	
Indeno(1,2,3-cd)pyrene	370 ј	1600	ug/kg	90	
Isophorone	ND _J	8100	ug/kg ug/kg		
2-Methylnaphthalene	NTD I	1600	ug/kg ug/kg	320	
2-Methylphenol	ND	8100		320	
4-Methylphenol	ND	8100	ug/kg	300	
Naphthalene	ND	1600	ug/kg	360	
2-Nitroaniline	ND	42000	ug/kg	240	
3-Nitroaniline	ND	42000	ug/kg	500	
4-Nitroaniline	ND	42000	ug/kg	270	
Nitrobenzene	ND	1600	ug/kg	400	
2-Nitrophenol	ND	8100	ug/kg	410	
4-Nitrophenol	ND	42000	ug/kg	310	
N-Nitrosodi-n-propyl-	ND		ug/kg	4800	
amine	ND	1600	ug/kg	450	
N-Nitrosodiphenylamine	ND	1600	/1		
2,2'-oxybis	ND	1600	ug/kg	340	
(1-Chloropropane)	112	1600	ug/kg	360	
Pentachlorophenol	$_{ exttt{ND}}$ $igveet$	01.00	,,		
Phenanthrene	460 J	8100	ug/kg	1400	
Phenol	ND J	1600	ug/kg	200	
Pyrene	770 J	1600	ug/kg	330	
2,4,5-Trichloro-	1	1600	ug/kg	440	
phenol	ND _J	8100	ug/kg	200	
2,4,6-Trichloro-	ND .T	01.00	t-		
phenol	ND J	8100	ug/kg	410	
T					

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Client Sample ID: SD-06

GC/MS Semivolatiles

Lot-Sample #...: C9D090311-006 Work Order #...: K9WLM1AC Matrix.....: SOLID

SURROGATE 2,4,6-Tribromophenol	PERCENT RECOVERY 55	RECOVERY LIMITS
2-Fluorobiphenyl 2-Fluorophenol	56	(35 - 124) (35 - 105)
Nitrobenzene-d5	51 52	(39 - 103) (25 - 104)
Phenol-d5 Terphenyl-d14	53 64	(25 - 105) (25 - 1 27)
NOTE (S):		·

J Estimated result. Result is less than RL.

Client Sample ID: SD-02

GC Semivolatiles

Lot-Sample #: C9D090311-002 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111038 Dilution Factor: 25 % Moisture: 87	Work Order #: Date Received: Analysis Date: Analysis Time: Initial Wgt/Vol: Analyst ID: Method:	04/09/09 04/23/09 19:26 15 g 402331	MS Run Final Instru	#: SOLID ##: 9111020 Wgt/Vol.: 10 mL ment ID.: C/D
PARAMETER		REPORTING		
alpha-BHC	RESULT	LIMIT	UNITS	MDL
beta-BHC	ND J	320	ug/kg	48
delta-BHC	ND	320	ug/kg	37
gamma-BHC (Lindane)	ND	320	ug/kg	33
Heptachlor	ND	320	ug/kg	44
Aldrin	ND	320	ug/kg	40
· ·	ND	320	ug/kg	34
Heptachlor epoxide Endosulfan I	ND	320	ug/kg	32
Dieldrin	ND	320	ug/kg	33
	ND	320	ug/kg	24
4,4'-DDE Endrin	ND	320	ug/kg	19
	ND	320	ug/kg	25
Endrin ketone	ND	320	ug/kg	37
Endrin aldehyde	ND	320	ug/kg	40
Endosulfan II	ND	320	ug/kg	73
4,4'-DDD	970	320	ug/kg	28
Endosulfan sulfate	ND	320	ug/kg	51
4,4'-DDT	ND	320	ug/kg	43
Methoxychlor	ND	630	ug/kg	130
	ND	320	ug/kg	20
	ND	320	ug/kg	32
Toxaphene	ND V	13000	ug/kg	2200
GIPP 2 CARP		RECOVERY LIMITS		
Tetrachloro-m-xylene				
Decachlorobiphenyl		(45 - 130) (45 - 130)		

NOTE (S):

NC The recovery and/or RPD were not calculated,

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Client Sample ID: SD-06

GC Semivolatiles

Lot-Sample #: C9D090311-006 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111038 Dilution Factor: 25 1 Moisture: 90	Work Order #: Date Received: Analysis Date: Analysis Time: Initial Wgt/Vol: Analyst ID: Method	04/09/09 04/23/09 20:16 15 g 402331	MS Run Final Instru	Wgt/Vol.: 10 mL
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	MDL
alpha-BHC	ND J	420	ug/kg	62
beta-BHC	ND	420	ug/kg	48
delta-BHC	ND	420	ug/kg	43
gamma-BHC (Lindane)	ND	420	ug/kg	57
Heptachlor	ND	420	ug/kg	52
Aldrin	ND	420	ug/kg	44
Heptachlor epoxide	ND	420	ug/kg	41
Endosulfan I	ND	420	ug/kg	43
Dieldrin	ND	420	ug/kg	30
4,4'-DDE	ND	420	ug/kg	25
Endrin	ND	420	ug/kg	33
Endrin ketone	ND	420	ug/kg	48
Endrin aldehyde	ND	420	ug/kg	52
Endosulfan II	ND	420	ug/kg	94
4,4'-DDD	ND	420	ug/kg	37
Endosulfan sulfate	ND	420	ug/kg	66
4,4'-DDT	ND	420	ug/kg	56
Methoxychlor	ND	810	ug/kg	170
alpha-Chlordane	ND	420	ug/kg	25
	ND	420	ug/kg	42
Toxaphene	ND ¥	16000	ug/kg	2800
CITEDOGATE		RECOVERY		
SURROGATE		LIMITS		
Tetrachloro-m-xylene		(45 - 130)		
Decachlorobiphenyl	NC, DIL	(45 - 130)		
NOTE(S):				

NOTE(S):

NC The recovery and/or RPD were not calculated.

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Client Sample ID: SD-02

GC Semivolatiles

Lot-Sample #: C9D090311-002 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111039 Dilution Factor: 0.5 † Moisture: 87	Work Order #: Date Received: Analysis Date: Analysis Time: Initial Wgt/Vol: Analyst ID: Method:	04/09/09 04/27/09 18:59 15 g 001797	MS Run Final	#	9111021 10 mL
		REPORTING			
PARAMETER	RESULT	LIMIT	UNITS	MDL	
Aroclor 1016	ND J	63	ug/kg	9.4	
Aroclor 1221	ND	63	ug/kg	12	
Aroclor 1232	ND	63	ug/kg	11	
Aroclor 1242	ND	63	ug/kg	10	
Aroclor 1248	ND	63	ug/kg	6.0	
Aroclor 1254	ND	63	ug/kg	9.0	
Aroclor 1260	ND \bigvee	63	ug/kg	9.0	
	PERCENT	RECOVERY			
SURROGATE	RECOVERY	LIMITS			
Tetrachloro-m-xylene	100	(35 - 140)			
Decachlorobiphenyl	95	(35 - 140)			
NOTE(S):					

Client Sample ID: SD-06

GC Semivolatiles

Lot-Sample #: C9D090311-006 Date Sampled: 04/08/09 Prep Date: 04/21/09 Prep Batch #: 9111039 Dilution Factor: 0.5 % Moisture: 90	Work Order #: Date Received: Analysis Date: Analysis Time: Initial Wgt/Vol: Analyst ID: Method	04/09/09 04/27/09 20:10 15 g 001797	MS Rur Final Instru	Wgt/Vol.: 10 mL
		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	MDL
Aroclor 1016	ND J	82	ug/kg	12
Aroclor 1221	ND	82	ug/kg	16
Aroclor 1232	ND	82	ug/kg	14
Aroclor 1242	ND	82	ug/kg	13
Aroclor 1248	ND	82	ug/kg	7.7
Aroclor 1254	ND	82	ug/kg	12
Aroclor 1260	ND \bigvee	82	ug/kg	12
	PERCENT	RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Tetrachloro-m-xylene	104	(35 - 140)		
Decachlorobiphenyl	99	(35 - 140)		
NOTE(S).				

NOTE(S):

Client Sample ID: SD-01

TOTAL Metals

Lot-Sample #...: C9D090311-001 Matrix..... SOLID Date Sampled...: 04/08/09 Date Received..: 04/09/09 *** Moisture....:** 91 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9120063 Cadmium 0.023 , 0.012 umoles/qm EPA SEM 04/30-05/01/09 K9WLF1AD Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 022952 Instrument ID..: TRACEICP MS Run #.....: MDL..... 0.00040 Copper 0.97 B J 22.1 umoles/qm EPA SEM 04/30-05/01/09 K9WLFLAC Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 022952 Instrument ID..: TRACEICP MS Run #....: MDL..... 0.0097 Nickel 0.27 J 0.19 umoles/gm EPA SEM 04/30-05/01/09 K9WLF1AF Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 022952 Instrument ID..: TRACEICP MS Run #....: MDL..... 0.0054 Lead J 1.1 0.0080 umoles/gm EPA SEM 04/30-05/01/09 K9WLF1AG Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 022952 Instrument ID..: TRACEICP MS Run #.....: MDL..... 0.0026 Zinc J 12.4 0.42 umoles/gm EPA SEM 04/30-05/01/09 K9WLFlAH Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 022952 Instrument ID..: TRACEICP MS Run #.....: MDL..... 0.031 Prep Batch #...: 9120148 Mercury ND 0.00069 umoles/gm EPA SEM 04/30/09 K9WLF1AE Dilution Factor: 1 Analysis Time..: 00:00 Analyst ID....: 403938 Instrument ID..: HGHYDRA MS Run #.....: MDL..... 0.000072

NOTE(S):

B Estimated result. Result is less than RL.

Client Sample ID: SD-02

TOTAL Metals

Date Sampled: C9D090311-002 Date Sampled: 04/08/09 * Moisture: 87	Date Received: 04/09/09	Matrix:	SOLID
R	EPORTING	PREPARATION-	MODK

PARAMETER	DEGIT M	7 -14-			PREPARATION-	WORK
PARAMETER	RESULT	LIMIT	UNITS	METHOD	ANALYSIS DATE	ORDER #
Prep Batch #	: 9120063					
Cadmium	0.026 J			EPA SEM	04/30-05/01/09	K9WLH1AH
		Dilution Factor		Analysis Time: 00:00	Analyst ID	.: 022952
		Instrument ID	: TRACEICP	MS Run #:	MDL	: 0.00027
Copper	1.0 B - J			EPA SEM	04/30-05/01/09	K9WLH1AG
		Dilution Factor		Analysis Time: 00:00	Analyst ID	
		Instrument ID	: TRACEICP	MS Run #:	MDL	: 0.0067
Nickel	0.25 J	0.13 ι	umoles/gm	EPA SEM	04/30-05/01/09	K9WT.H1AK
		Dilution Factor		Analysis Time: 00:00	Analyst ID	
		Instrument ID	: TRACEICP	MS Run #:	MDL	
Tood	T					
Lead	1.4 J			EPA SEM	04/30-05/01/09	K9WLH1AL
		Dilution Factor:		Analysis Time: 00:00	Analyst ID	: 022952
		Instrument ID:	: TRACEICP	MS Run #:	MDL	: 0.0018
Zinc	13.8 J	0.29 ບ	umoles/gma	EPA SEM	04/30-05/01/09	K9WLH1AM
		Dilution Factor:	: 1	Analysis Time: 00:00	Analyst ID	
		Instrument ID:	TRACEICP	MS Run #:	MDL	
Prep Batch #.	9120148					
Mercury	ND T	0.00047 u	moles/cm	EPA SEM	04/20/00	
4	U	Dilution Factor:				K9WLH1AJ
		Instrument ID:		Analysis Time: 00:00 MS Run #:	Analyst ID	
				THE TOTAL TRANSPORT	MDL	: 0.000049
NOTE(S):						

NOTE(S):

B Estimated result. Result is less than RL.

Client Sample ID: SD-03

TOTAL Metals

	C9D090311: 04/08/09: 66	-003 Date Received: 04/09/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #	: 9120063		
Cadmium	0.0045	0.0033 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLJ1AD Analyst ID: 022952 MDL 0.00011
Copper	0.22 B - J	6.0 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WI_J1AC Analyst ID: 022952 MDL: 0.0026
Nickel	0.099	0.051 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLJ1AF Analyst ID: 022952 MDL: 0.0015
Lead	0.14	0.0021 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30~05/01/09 K9WLJ1AG Analyst ID: 022952 MDL: 0.00071
Zinc	2.6	O.11 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLJ1AH Analyst ID: 022952 MDL: 0.0084
Prep Batch #.	: 9120148		
Mercury	ND	0.00018 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: HGHYDRA MS Run #:	04/30/09 K9WLJ1AE Analyst ID: 403938 MDL: 0.000019
NOTE(S):			

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

Client Sample ID: SD-04

TOTAL Metals

Lot-Sample #. Date Sampled. % Moisture	: 04/08/09	Date Received: 04/09/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #. Cadmium	: 9120063 0.0097 _J	0.0051 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLK1AD Analyst ID: 022952 MDL
Copper	0.62 B J	9.2 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLK1AC Analyst ID: 022952 MDL: 0.0040
Nickel	0.32 J	0.078 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLK1AF Analyst ID: 022952 MDL: 0.0022
Lead	0.34 ј	0.0033 umoles/gm RPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLK1AG Analyst ID: 022952 MDL: 0.0011
Zinc	5.1 J	0.17 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLK1AH Analyst ID: 022952 MDL: 0.013
Prep Batch # Mercury	.: 9120148 ND J	0.00028 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: HGHYDRA MS Run #:	04/30/09 K9WLK1AE Analyst ID: 403938 MDL: 0.000030

Results and reporting limits have been adjusted for dry weight.

NOTE(S):

B Estimated result. Result is less than RL.

Client Sample ID: SD-05

TOTAL Metals

Lot-Sample # Date Sampled % Moisture	.: 04/08/09	-005 Date Received:	04/09/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS	METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch # Cadmium	.: 9120063 0.0099 _J	0.0073 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	04/30-05/01/09 K9WLL1AD Analyst ID: 022952 MDL 0.00024
Copper	0.61 B J	13.2 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	04/30-05/01/09 K9WLL1AC Analyst ID: 022952 MDL: 0.0058
Nickel	0.26 _J	0.11 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	04/30-05/01/09 K9WLL1AF Analyst ID: 022952 MDL: 0.0032
Lead	0.34 ј	0.0048 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	04/30-05/01/09 K9WLL1AG Analyst ID: 022952 MDL: 0.0016
Zinc	6.0 _J	0.25 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	04/30-05/01/09 K9WLL1AH Analyst ID: 022952 MDL: 0.019
Prep Batch # Mercury	: 9120148 ND _J		EPA SEM Analysis Time: 00:00 MS Run #:	04/30/09 K9WLL1AE Analyst ID: 403938 MDL

Results and reporting limits have been adjusted for dry weight.

NOTE(S):

B Estimated result. Result is less than RL.

Client Sample ID: SD-06

TOTAL Metals

	C9D090311: 04/08/09: 90	Date Received: 04/09/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #	: 9120063		
Cadmium	0.015 J	0.011 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLM1AH Analyst ID: 022952 MDL: 0.00035
Copper	0.71 B J	19.7 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLM1AG Analyst ID: 022952 MDL 0.0087
Nickel	0.21 ^J	0.17 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLM1AK Analyst ID: 022952 MDL
Lead	0.64 J	0.0071 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #:	04/30-05/01/09 K9WLM1AL Analyst ID: 022952 MDL: 0.0023
Zinc	9.3 _J	0.38 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: TRACEICP MS Run #	04/30-05/01/09 K9WLM1AM Analyst ID: 022952 MDL 0.028
Prep Batch #.	: 9120148		
Mercury	ND J	0.00061 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:00 Instrument ID: HGHYDRA MS Run #:	04/30/09 K9WLM1AJ Analyst ID: 403938 MDL 0.000064
NOTE (S):			

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

Client Sample ID: SW-01

TOTAL Metals

Lot-Sample #...: C9D090311-007

Date Sampled...: 04/08/09

Date Received..: 04/09/09

	01,00,00	Date veceta	ed.:: 04/09/09	
		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Prep Batch #.	9117204	·		
Silver	N D	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AD
		Dilution Factor: 1	Analysis Time: 12:17	
		Instrument ID: ICP		Analyst ID: 400149
Arsenic	2.4	1.0 ug/L	SW846 6020	04/37 05/04/00 707777
		Dilution Factor: 1	Analysis Time: 12:17	04/27-05/04/09 K9WLN1AR
		Instrument ID: ICPM		Analyst ID: 400149 1 MDL 0.14
Barium	62.9	10.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AF
		Dilution Factor: 1	Analysis Time: 12:17	Analyst ID: 400149
		Instrument ID: ICPM		
Beryllium	ND	1.0 ug/L	SW846 6020	
•		Dilution Factor: 1	·	04/27-05/04/09 K9WLN1AG
		Instrument ID. : ICPM	Analysis Time: 12:17 IS2 MS Run #: 911712	Analyst ID: 400149
				1 MDL 0.068
Boron	298	5.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AH
		Dilution Factor: 1	Analysis Time: 12:17	Analyst ID: 400149
		Instrument ID: ICPM	S2 MS Run #: 911712	
Cadmium	ND	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AJ
		Dilution Factor: 1	Analysis Time: 12:17	Analyst ID: 400149
		Instrument ID: ICPM		
				MDB 0.11
Chromium	4.9 8	2.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AK
		Dilution Factor: 1	Analysis Time: 12:17	Analyst ID: 400149
		Instrument ID: ICPM		
Copper	2.7 <i>3</i> ′	2.0 ug/L	SW846 6020	04/27 05/04/00 =======
		Dilution Factor: 1	Analysis Time: 12:17	04/27-05/04/09 K9WLN1AL
		Instrument ID: ICPM		Analyst ID: 400149
		, and an analysis	παι π 911/12.	MDL 0.14
Iron	2220	50.0 ug/L	SW846 6020	04/27-05/04/09 K9WLN1AM
		Dilution Factor: 1	Analysis Time: 12:17	Analyst ID: 400149
		Instrument ID: ICPMS	52 MS Run #: 9117123	

(Continued on next page)

Client Sample ID: SW-01

TOTAL Metals

Lot-Sample #: C9D090311-007	Matrix WATER
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	DEG. T	REPORTING			PREPARATION-	WORK
PARAMETER	RESULT	LIMIT	<u>UNITS</u>	METHOD	ANALYSIS DATE	ORDER #
Manganese	315	0.50	ug/L	SW846 6020	04/27-05/04/09	K9WLN1AN
		Dilution Facto	or: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID	: ICPMS2	MS Run # 911712	_	
Nickel	4.4	1.0	ug/L	SW846 6020	04/27-05/04/09	FOWT MIXD
		Dilution Facto	or: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID.	.: ICPMS2	MS Run #: 911712		
Lead	8.2	1.0	ug/L	SW846 6020	04/27-05/04/09	K9WLN1AO
		Dilution Facto	r: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID.	.: ICPMS2	MS Run #: 911712	1 MDL	
Antimony	0.90 B J	2.0	ug/L	SW846 6020	04/27-05/04/09	K9WIN1AR
		Dilution Facto	r: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID.	.: ICPMS2	MS Run #: 911712	1 MDL	
Selenium 5	5.0 1.4 B , J UE	5.0	ug/L	SW846 6020	04/27-05/04/09	K9WINIAT
		Dilution Facto	r: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID.	.: ICPMS2	MS Run # 911712		
Thallium	0.12 B J	1.0	ug/L	SW846 6020	04/27-05/04/09	K9WLN1 AIT
		Dilution Facto	r: 1	Analysis Time: 12:17	Analyst ID	
		Instrument ID.	.: ICPMS2	MS Run # 9117121		
Zinc	22.4	5.0	ug/L	SW846 6020	04/27-05/04/09	POST NO NO
		Dilution Factor	r: 1	Analysis Time: 12:17	Analyst ID:	
		Instrument ID.	.: ICPMS2	MS Run #: 9117121		
				100000000000000000000000000000000000000	MDD	0.60
Prep Batch #	9119027					
Mercury	ND	0.20	ug/L	SW846 7470A	04/29/09	K9WLN1AW
		Dilution Factor	r: 1	Analysis Time: 09:29	Analyst ID:	
		Instrument ID.	: HGHYDRA	MS Run # 9119014		
7700mm (a)						

NOTE(S):

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-02

TOTAL Metals

Lot-Sample #...: C9D090311-008 Matrix....: WATER Date Sampled...: 04/08/09 Date Received..: 04/09/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMJ1AD Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 1.6 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMJ1AE Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL....: 0.14 Barium 61.2 10.0 ug/L SW846 6020 04/27-05/04/09 K9WMJLAF Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 MS Run #....: 9117121 Instrument ID..: ICPMS2 MDL..... 0.076 Beryllium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMJ1AG Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.068 Boron 299 5.0 uq/L SW846 6020 04/27-05/04/09 K9WMJlAH Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMJ1AJ Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 5.5 J 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMJIAK Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.11 Copper 1.8-B, J- 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMJ1AL Dilution Factor: 1 Analysis Time..: 12:22 Analyst ID....: 400149 MS Run #.....: 9117121 Instrument ID..: ICPMS2 MDL..... 0.14 Iron 1970 50.0 ug/L SW846 6020 04/27-05/04/09 K9WMJ1AM

(Continued on next page)

Analysis Time..: 12:22

MS Run #..... 9117121

Analyst ID....: 400149

MDL.... 7.4

Dilution Factor: 1

Instrument ID..: ICPMS2

Client Sample ID: SW-02

TOTAL Metals

Matrix..... WATER

Lot-Sample #:	C9D090311-008	
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	312	0.50 ug/L	SW846 6020	04/27-05/04/09 K9WMJIAN
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Nickel	3.8	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJIAP
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.073
Lead	7.1	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJ1AQ
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.020
Antimony	0.82 B J	2.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJ1AR
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.047
Selenium 5.	0 1.1 B,J UI	B 5.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJ1AT
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117123	1 MDL 0.21
Thallium	0.074 B J	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJ1AU
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117123	1 MDL 0.018
Zinc	19.6	5.0 ug/L	SW846 6020	04/27-05/04/09 K9WMJ1AV
		Dilution Factor: 1	Analysis Time: 12:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 9117121	
Prep Batch #.	• 9119027			
Mercury	ND	0.20 ug/L	SW846 7470A	04/29/09 K9WMJ1AW
-		Dilution Factor: 1	Analysis Time: 09:31	04/29/09 K9WMJ1AW Analyst ID: 031043
		Instrument ID.:: HGHYDRA	MS Run #: 9119014	
			W	
MORE (a)				

NOTE(S):

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-03

TOTAL Metals

Lot-Sample #...: C9D090311-009 Matrix..... WATER Date Sampled...: 04/08/09 Date Received..: 04/09/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMK1AD Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 1.9 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMKlar Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL....: 0.14 Barium 57.4 10.0 ug/L SW846 6020 04/27-05/04/09 K9WMKlaF Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.076 Beryllium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMK1AG Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.068 Boron 317 5.0 uq/L SW846 6020 04/27-05/04/09 K9WMK1AH Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #...... 9117121 MDL..... 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMK1AJ Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #...... 9117121 MDL..... 0.11 Chromium 5.3 ₹ 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMK1AK Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Copper 1.6 B, J J 2.0 uq/L SW846 6020 04/27-05/04/09 K9WMK1AL Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.14 Iron 1270 50.0 ug/L SW846 6020 04/27-05/04/09 K9WMKlam Dilution Factor: 1 Analysis Time..: 12:26 Analyst ID....: 400149

(Continued on next page)

MS Run #.....: 9117121

MDL..... 7.4

Instrument ID..: ICPMS2

Client Sample ID: SW-03

TOTAL Metals

Lot-Sample #: C9D090311-009	Matrix WATER
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	303	0.50 ug/L	SW846 6020	04/27-05/04/09 K9WMK1AN
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS	2 MS Run #: 911712	
372 -1- 3				
Nickel	3.8	$1.0~{ m ug/L}$	SW846 6020	04/27-05/04/09 K9WMK1AP
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS	2 MS Run #: 911712	
Lead	3.3	1.0 ug/L	SW846 6020	04/27 05/04/00 2007577
		Dilution Factor: 1	Analysis Time: 12:26	04/27-05/04/09 K9WMK1AQ
		Instrument ID.:: ICPMS		Analyst ID: 400149 1 MDL 0.020
				1 MDE
Antimony	0.71 B	J 2.0 ug/L	SW846 6020	04/27-05/04/09 K9WMK1AR
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS		
0-1		_		
Selenium 5.	0 1.2 B ,∂ (J.	SW846 6020	04/27-05/04/09 R9WMK1AT
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS	MS Run # 911712	1 MDL 0.21
Thallium	0.041 B	J 1.0 ug/L	SW846 6020	04/27-05/04/09 R9WMK1AU
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS2		
_				1.021
Zinc	9.5	5.0 ug/L	SW846 6020	04/27-05/04/09 K9WMK1AV
		Dilution Factor: 1	Analysis Time: 12:26	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117121	MDL 0.60
_				
Prep Batch #.				
Mercury	ND	0.20 ug/L	SW846 7470A	04/29/09 K9WMK1AW
		Dilution Factor: 1	Analysis Time: 09:32	Analyst ID: 031043
		Instrument ID: HGHYDR	A MS Run #: 9119014	MDL 0.038
NOTE(S):				
				

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-04

TOTAL Metals

Lot-Sample #...: C9D090311-010 Matrix..... WATER Date Sampled...: 04/08/09 **Date Received..:** 04/09/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WML1AD Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 2.1 1.0 ug/L SW846 6020 04/27-05/04/09 K9WML1AE Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.14 Barium 66.4 10.0 SW846 6020 uq/L 04/27-05/04/09 K9WML1AF Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.076 Beryllium 0.076 -B J 1.0 uq/L SW846 6020 04/27-05/04/09 K9WML1AG Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.068 Boron 334 5.0 ug/L SW846 6020 04/27-05/04/09 K9WMLlAH Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #...... 9117121 MDL..... 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WML1AJ Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.11 Chromium 5.1.72.0 uq/L SW846 6020 04/27-05/04/09 K9WML1AK Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Copper 2.6 3 2.0 uq/L SW846 6020 04/27-05/04/09 K9WMLLAL Dilution Factor: 1 Analysis Time..: 12:44 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.14 Iron 1810 50.0

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SW846 6020

Analysis Time..: 12:44

MS Run #..... 9117121

04/27-05/04/09 K9WML1AM

Analyst ID....: 400149

MDL.... 7.4

uq/L

Dilution Factor: 1

Instrument ID..: ICPMS2

Client Sample ID: SW-04

TOTAL Metals

Lot-Sample #:	C9D090311-010	Matrix:
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	277	0.50 ug/L	SW846 6020	04/27-05/04/09 K9WML1AN
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Nickel	4.9	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WML1AP
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Lead	5.4	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WML1AO
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Antimony	1.5 B J	2.0 ug/L	SW846 6020	04/27-05/04/09 K9WML1AR
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Selenium	1.7 ઇ ,₹	J 5.0 ug/ L	SW846 6020	04/27-05/04/09 K9WML1AT
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.21
Thallium 1.0	0.047 B	JB 1.0 ug/L	SW846 6020	04/27-05/04/09 K9WML1AU
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Zinc	13.9	5.0 ug/L	SW846 6020	04/27-05/04/09 K9WML1AV
		Dilution Factor: 1	Analysis Time: 12:44	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117121	
Prep Batch #.	• 0110007			
Mercury	ND	0.20 ug/L	SW846 7470A	04/29/09 K9WMI.1AW
_		Dilution Factor: 1	Analysis Time: 09:34	04/29/09 K9WML1AW Analyst ID: 031043
		Instrument ID: HGHYDRA	MS Run #: 9119014	
TOTTE (a)				

NOTE(S):

WATER

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SW-05

TOTAL Metals

Lot-Sample #...: C9D090311-011 Matrix....: WATER Date Sampled...: 04/08/09 Date Received..: 04/09/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMM1AD Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 1.4 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMM1AE Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.14 Barium 69.9 10.0 ug/L SW846 6020 04/27-05/04/09 K9WMMLAF Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.076 Beryllium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMM1AG Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.068 Boron 372 5.0 uq/L SW846 6020 04/27-05/04/09 K9WMM1AH Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMM1AJ Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 4.5 J 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMMLAK Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Copper 1.5 B,J J 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMM1AL Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.14 Iron 1400 50.0 ug/L SW846 6020 04/27-05/04/09 K9WMMIAM Dilution Factor: 1 Analysis Time..: 12:48 Analyst ID....: 400149

(Continued on next page)

MS Run #..... 9117121

MDL..... 7.4

Instrument ID..: ICPMS2

Client Sample ID: SW-05

TOTAL Metals

Matrix..... WATER

Lot-Sample #:	C9D090311-011
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		REPORTING			PREPARATION- WORK
PARAMETER	RESULT	LIMIT	UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	244	0.50	ug/L	SW846 6020	04/27-05/04/09 K9WMM1A
		Dilution Factor	r: 1	Analysis Time: 12:48	
		Instrument ID.	.: ICPMS2	MS Run #: 91171	•
Nickel	4.1	1.0	ug/L	SW846 6020	04/27-05/04/09 K9WMMLA
		Dilution Factor	r: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID.,	: ICPMS2	MS Run # 91171	-
Lead	3.9	1.0	ug/L	SW846 6020	04/27-05/04/09 K9WMMlA
		Dilution Factor	: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID	: ICPMS2	MS Run #: 91171	
Antimony	0.90 B J	2.0	ug/L	SW846 6020	04/27-05/04/09 K9WMM1A
		Dilution Factor	: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID	: ICPMS2	MS Run #: 911712	
Selenium	1.4 B,J	5.0	ug/L	SW846 6020	04/27-05/04/09 K9WMM1A
		Dilution Factor	: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID	: ICPMS2	MS Run #: 911712	
Thallium 1.0	0.020 B ∪	B 1.0	ug/L	SW846 6020	04/27-05/04/09 K9WMMlAT
		Dilution Factor	: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID	: ICPMS2	MS Run #: 911712	1 MDL 0.018
Zinc	8.2	5.0 t	ug/L	SW846 6020	04/27-05/04/09 K9WMM1AV
		Dilution Factor	: 1	Analysis Time: 12:48	Analyst ID: 400149
		Instrument ID	: ICPMS2	MS Run #: 911712	
Prep Batch #	- 0110007				
Mercury	ND ND	0.20 ι	.~ /⊺	CHOAC DARAN	
<i> j</i>	110	Dilution Factor	ıg/L	SW846 7470A	04/29/09 K9WMM1AW
		Instrument ID		Analysis Time: 09:39 MS Run #: 911901	Analyst ID: 031043 4 MDL: 0.038
NOTE(S):					

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-06

TOTAL Metals

Lot-Sample #...: C9D090311-012 Matrix..... WATER Date Sampled...: 04/08/09 Date Received..: 04/09/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 uq/L SW846 6020 04/27-05/04/09 K9WMP1AD Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 0.72 B J 1.0 ug/L SW846 6020 04/27-05/04/09 K9WMP1AE Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL....: 0.14 Barium 72.6 10.0 ug/L SW846 6020 04/27-05/04/09 K9WMP1AF Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.076 Beryllium ND1.0 uq/L SW846 6020 04/27-05/04/09 K9WMP1AG Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #...... 9117121 MDL..... 0.068 Boron 378 5.0 ug/L SW846 6020 04/27-05/04/09 K9WMPLAH Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID.,: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND ug/L 1.0 SW846 6020 04/27-05/04/09 K9WMP1AJ Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 5.0 J 2.0 ug/L SW846 6020 04/27-05/04/09 K9WMP1AK Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Copper 1.4 B,J J 2.0 04/27-05/04/09 K9WMPlAL uq/L SW846 6020 Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL....: 0.14 Iron 937 50.0 ug/L SW846 6020 04/27-05/04/09 K9WMPIAM Dilution Factor: 1 Analysis Time..: 12:53 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 7.4

(Continued on next page)

Client Sample ID: SW-06

TOTAL Metals

Matrix....: WATER

Lot-Sample #:	C9D090311-012	
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	_ ANALYSIS DATE ORDER #
Manganese	227	0.50 ug/L	SW846 6020	04/27-05/04/09 K9WMP1AN
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPM	52 MS Run #: 91173	121 MDL 0.047
Nickel	3.8	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMP1AE
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPM	32 MS Run #: 91171	L21 MDL 0.073
Lead	4.9	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMPlac
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPM	32 MS Run # 91171	
Antimony	0.90 B	J 2.0 ug/L	SW846 6020	04/27 05/04/00 7000000
		Dilution Factor: 1	Analysis Time: 12:53	04/27-05/04/09 K9WMPLAR Analyst ID: 400149
		Instrument ID: ICPM		1 = = = 111111 100113
Selenium 5.	0 1.2 B , J (_{JB} 5.0 աց/և	SW846 6020	04/27-05/04/09 K9WMP1AT
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPMS		1
Thallium	ND	1.0 ug/L	SW846 6020	04/27-05/04/09 K9WMP1AU
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPMS	2 MS Run #: 91171	
Zinc	11.4	5.0 ug/L	SW846 6020	04/27-05/04/09 K9WMP1AV
		Dilution Factor: 1	Analysis Time: 12:53	
		Instrument ID: ICPMS		
Prep Batch #.	- 0110007			
Mercury	ND	0.20 ug/L	CMOAC BARON	0.4.00.4.00
· <u>,</u>		Dilution Factor: 1	SW846 7470A	04/29/09 K9WMP1AW
		Instrument ID: HGHYD	Analysis Time: 09:41 RA MS Run #: 911903	
			91190	14 MDL 0.038
NOTE(S):				

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Acid Volatile Sulfide

Lab Name:

TESTAMERICA PITTSBURGH

Method:

EPA

AVS

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D090311

Matrix:

SOLID

AMBIENT MICRO-MIDI ACID PURGE

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SD-01	C9D090311 001	K9WLF1AJ	377 J	umoles/g	1.7	5.5	1	4/22/2009 - 4/23/2009 00:00	9112451
SD-02	C9D090311 002	K9WLH1AN	227 J	umoles/g	1.2	3.8	1	4/22/2009 - 4/23/2009 00:00	9112451
SD-03	C9D090311 003	K9WLJ1AJ	51.5	umoles/g	0.46	1.5	1	4/22/2009 - 4/23/2009 00:00	9112451
SD-04	C9D090311 004	K9WLK1AJ	87.9 J	umoles/g 	0.71	2.3	1	4/22/2009 - 4/23/2009 00:00	9112451
SD-05	C9D090311 005	K9WLL1AJ	J 99.1	umoles/g	1.0	3.3	1	4/22/2009 - 4/23/2009 00:00	9112451
SD-06	C9D090311 006	K9WLM1AN	74.8 J	umoles/g	1.5	4.9	1	4/22/2009 - 4/23/2009 00:00	9112451

Hardness, as CaCO3

Lab Name:

TESTAMERICA PITTSBURGH

Method:

SM20

2340C

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D090311

Matrix: WATER

NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SW-01	C9D090311 007	K9WLN1AA	408	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460
SW-02	C9D090311 008	K9WMJ1AA	400	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460
SW-03	C9D090311 009	K9WMK1A	456	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460
SW-04	C9D090311 010	K9WML1AA	400	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460
SW-05	C9D090311 011	K9WMM1A	396	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460
SW-06	C9D090311 012	K9WMP1A	352	mg/L	3.1	10.0	2	5/5/2009 - 5/5/2009 00:00	9125460

Ammonia Nitrogen

Lab Name:

TESTAMERICA PITTSBURGH

Method:

MCAWW 350.1

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D090311

Matrix:

WATER

NPDES Distillation

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SW-01	C9D090311 007	K9WLN1AC	2.9 J -	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033
SW-02	C9D090311 008	K9WMJ1AC	3,3 J	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033
SW-03	C9D090311 009	K9WMK1A	3.1 - J	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033
SW-04	C9D090311 010	K9WML1AC	3.3 J	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033
SW-05	C9D090311 011	K9WMM1A	3.1 +	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033
SW-06	C9D090311 012	K9WMP1A	3.0	mg/L	0.016	0.10	1	4/30/2009 - 5/4/2009 00:00	9120033

Percent Solids

Lab Name:

TESTAMERICA PITTSBURGH

Method:

SM20

2540G

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D090311

Matrix: SOLID

NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SD-01	C9D090311 001	K9WLF1AA	9.1	%	0.0	1.0	1	4/18/2009 - 4/19/2009 07:02	9108018
SD-02	C9D090311 002	K9WLH1AA	13.2	%	0.0	1.0	1	4/18/2009 - 4/19/2009 07:02	9108018
SD-03	C9D090311 003	K9WLJ1AA	33.7	%	0.0	1.0	1	4/18/2009 - 4/19/2009 07:02	9108018
SD-04	C9D090311 004	K9WLK1AA	21.9	%	0.0	1.0	1	4/18/2009 - 4/19/2009 07:02	9108018
SD-05	C9D090311 005	K9WLL1AA	15.2	%	0.0	1.0	1	4/18/2009 - 4/19/2009 07:02	9108018
SD-06	C9D090311 006	K9WLM1AA	10.2	%	0.0		1	4/18/2009 - 4/19/2009 07:02	9108018

Lab Name:

TESTAMERICA PITTSBURGH

Method:

EPA

Lloyd Kahn

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D090311

Matrix:

SOLID

Total Organic Carbon by Lloyd Kahn

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SD-02	C9D090311 002	K9WLH1AF	111000	mg/kg	360	3150	0.83	4/19/2009 - 4/19/2009 00:00	9107132
SD-06	C9D090311 006	K9WLM1AF	329000	mg/kg	539	4720	0.96	4/19/2009 - 4/19/2009 00:00	9107132

Client Sample ID: SD-02

TOTAL Metals

Lot-Sample #...: C9F100120-001 Matrix..... SOLID **Date Sampled...:** 04/08/09 Date Received..: 04/09/09 **% Moisture....:** 87 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9161585 Zinc 2190 7.6 mg/kg SW846 6010B 06/10-06/11/09 LEL1W1AC Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #..... 9161323 MDL..... 0.85 Beryllium 1.9 J 1.5 mq/kq SW846 6010B 06/10-06/11/09 LEL1W1AD Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID. .: TRACEICP MS Run #..... 9161323 MDL....: 0.057 Nickel 62.4 15.2 mg/kg SW846 6010B 06/10-06/11/09 LELIWIAE Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID.:: TRACEICP MS Run #.....: 9161323 MDL..... 1.5 Copper 182 9.5 mg/kg SW846 6010B 06/10-06/11/09 LEL1W1AF Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #.....: 9161323 MDL..... 1.3 Antimony 4.5 3.8 mg/kg SW846 6010B 06/10-06/11/09 LEL1W1AG Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #.....: 9161323 MDL..... 0.62 Arsenic 34.9 3.8 mq/kq SW846 6010B 06/10-06/11/09 LEL1W1AH Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID. .: TRACEICP MS Run #..... 9161323 MDL..... 0.85 Cadmium 9.0 1.9 mg/kg SW846 6010B 06/10-06/11/09 LEL1W1AJ Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID.:: TRACEICP MS Run #.....: 9161323 MDL....: 0.091 Chromium 157 1.9 mq/kq SW846 6010B 06/10-06/11/09 LEL1W1AK Dilution Factor: 0.5 Analyst ID....: 400491 Analysis Time..: 23:48 Instrument ID..: TRACEICP MS Run #.....: 9161323 MDL..... 0.32 Lead 689 1.1 mg/kg SW846 6010B 06/10-06/11/09 LELIWIAL Dilution Factor: 0.5 Analysis Time..: 23:48 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #..... 9161323 MDL..... 0.55

(Continued on next page)

Tetra Tech EM, Inc

Client Sample ID: SD-02

TOTAL Metals

Lot-Sample #...: C9F100120-001

Matrix SOLID

PARAMETER Selenium	RESULT 3.2 J	REPORTING LIMIT UNITS 1.9 mg/kg Dilution Factor: 0.5	METHOD SW846 6010B Analysis Time: 23:48	PREPARATION- WORK ANALYSIS DATE ORDER # 06/10-06/11/09 LELIWIAM Analyst ID: 400491
Silver	3.2	Instrument ID.:: TRACEICP 1.9 mg/kg Dilution Factor: 0.5 Instrument ID.:: TRACEICP	MS Run # 916132 SW846 6010B Analysis Time 23:48 MS Run # 916132	06/10-06/11/09 LEL1W1AN Analyst ID: 400491
Thallium	ND	7.6 mg/kg Dilution Factor: 1 Instrument ID.:: TRACEICP	SW846 6010B Analysis Time: 16:09 MS Run #: 916132	06/10-06/15/09 LEL1W1AP Analyst ID: 400491
Prep Batch # Mercury	.: 9162032 0.71	0.13 mg/kg Dilution Factor: 0.5	SW846 7471A Analysis Time: 09:16	06/11/09 LEL1W1AQ Analyst ID: 031043

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Tetra Tech EM, Inc

Client Sample ID: SD-06

TOTAL Metals

Lot-Sample #...: C9F100120-002 Matrix..... SOLID Date Sampled...: 04/08/09 Date Received..: 04/09/09 **% Moisture....:** 78 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9161585 Zinc 561 J 4.6 mg/kg SW846 6010B 06/10-06/11/09 LEL111AC Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #.....: 9161323 MDL..... 0.51 Beryllium 0.63 B, J UBJ 0.91 SW846 6010B mq/kq 06/10-06/11/09 LEL111AD Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #....: 9161323 MDL..... 0.034 Nickel 22.4 J 9.1 mg/kg SW846 6010B 06/10-06/11/09 LEL111AE Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #..... 9161323 MDL..... 0.88 Copper 57.2 5.7 06/10-06/11/09 LKL111AF mg/kg SW846 6010B Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #.....: 9161323 MDL..... 0.78 Antimony 1.2 B 2.3 mg/kg SW846 6010B 06/10-06/11/09 LEL111AG Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 MS Run #....: 9161323 Instrument ID..: TRACEICP MDL..... 0.37 Arsenic 8.8 2.3 mg/kg SW846 6010B 06/10-06/11/09 LEL111AH Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #..... 9161323 MDL.... 0.51 Cadmium 2.1 1.1 mg/kg SW846 6010B 06/10-06/11/09 LEL111AJ Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID.:: TRACEICP MS Run #.....: 9161323 MDL..... 0.055 Chromium 36.8 1.1 mg/kg SW846 6010B 06/10-06/11/09 LEL111AK Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID.:: TRACEICP MS Run #....: 9161323 MDL..... 0.19 Lead 131 0.69 06/10-06/11/09 LKL111AL ung/kg SW846 6010B Dilution Factor: 0.5 Analysis Time..: 23:43 Analyst ID....: 400491 Instrument ID..: TRACEICP MS Run #..... 9161323 MDL..... 0.33

(Continued on next page)

Tetra Tech EM, Inc

Client Sample ID: SD-06

TOTAL Metals

Instrument ID.:: TRACEICP MS Run #.....: 9161323

Dilution Factor: 0.5

Lot-Sample #...: C9F100120-002

RESULT

J

1.7

1.1

ND

REPORTI	NG				PREPARATION- WORK
LIMIT	UNITS	METHO	D		ANALYSIS DATE ORDER #
1.1	mg/kg	SW846	6010B		06/10-06/11/09 LEL111AM
Dilution Fa	ctor: 0.5	Analysis	Time:	23:43	Analyst ID: 400491
Instrument	ID: TRACEICP	MS Run #	:	916132	B MDL 0.47
1.1	mg/kg	SW846	6010B		06/10-06/11/09 LEL111AN
Dilution Fa	ctor: 0.5	Analysis	Time:	23:43	Analyst ID: 400491
Instrument	ID: TRACEICP	MS Run #	:	9161323	MDL 0.13
2.3	mg/kg	SW846	6010B		06/10-06/11/09 LEL111AP

Analyst ID....: 400491

MDL..... 0.47

Matrix..... SOLID

Prep Batch #...: 9162032 Mercury 0.31

0.075 mg/kg SW846 7471A 06/11/09 LEL111AQ Dilution Factor: 0.5 Analyst ID....: 031043 Analysis Time..: 09:18 Instrument ID..: HGHYDRA MS Run #..... 9162021 MDL..... 0,025

Analysis Time..: 23:43

NOTE(S):

PARAMETER

Selenium

Silver

Thallium

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.



Indian Ridge Marsh

Data Review

CHICAGO, ILLINOIS

Semivolatiles, Pesticides, PCBs, Metals, AVS/SEM and Miscellaneous Analyses

SDG#C9D110102

Analyses Performed By: TestAmerica Laboratories Pittsburgh, Pennsylvania

Report: #23466R Review Level: Tier III

Project: CI001805.0001.00001

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # C9D110102 for samples collected in association with the Indian Ridge Marsh Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

				0	Commis			Analysis	3	
SDG Number	Sample ID	Lab ID	Matrix	trix		svoc	AVS/ SEM	PEST/ PCB	MET	MISC
	SD-07 04092009	C9D110102001	Sediment	4/9/2009			Х			
	SD-08 04092009	C9D110102002	Sediment	4/9/2009			Х			
	SD-09 04092009	C9D110102003	Sediment	4/9/2009			Х			
	SD-09D 04092009	C9D110102004	Sediment	4/9/2009	SD-09		Х			
	SD-10 04092009	C9D110102005	Sediment	4/9/2009			Х			
C9D110102	SW-07 04092009	C9D110102006	Water	4/9/2009					Х	Х
	SW-08 04092009	C9D110102007	Water	4/9/2009					Х	Х
	SW-09 04092009	C9D110102008	Water	4/9/2009					Х	Х
	SW-09D 04092009	C9D110102009	Water	4/9/2009	SW-09				Х	Х
	SW-10 04092009	C9D110102010	Water	4/9/2009					Х	Х
	ER-1 04092009	C9D110102011	Water	4/9/2009		Х		Х	Х	Х

Note:

- 1. Miscellaneous analyses for surface waters include Ammonia-Nitrogen and Hardness.
- 2. Miscellaneous analyses for sediment samples include TOC.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

	Re		Reported		mance ptable	Not
	Items Reviewed	No	Yes	No	Yes	Required
1.	Sample receipt condition		Х		Х	
2.	Requested analyses and sample results		Х		Х	
3.	Master tracking list		Х		Х	
4.	Methods of analysis		Х		Х	
5.	Reporting limits		Х		Х	
6.	Sample collection date		Х		Х	
7.	Laboratory sample received date		Х		Х	
8.	Sample preservation verification (as applicable)		Х		Х	
9.	Sample preparation/extraction/analysis dates		Х		Х	
10.	Fully executed Chain-of-Custody (COC) form		Х		Х	
11.	Narrative summary of QA or sample problems provided		Х		Х	
12.	Data Package Completeness and Compliance		Х		Х	

QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8270C, 8082A and 8081A. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999 and professional judgement.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SEMI-VOLATILE VOLATILE ORGANIC COMPOUND (SVOC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW 946 92700	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
SW-846 8270C	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (15%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
EB 4 04002000	CCV % D	Benzaldehyde	-33.5%
ER-1 04092009	CCV %D	Atrazine	-28.9%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
	RRF <0.05	Non-detect	R
	KKF <0.05	Detect	J
Initial and Continuing	RRF <0.01 ¹	Non-detect	R
Calibration	KKF <0.01	Detect	J
	RRF >0.05 or RRF >0.01 ¹	Non-detect	No Action
	KKF >0.05 0 KKF >0.01	Detect	NO ACTION
	%RSD > 15% or a correlation	Non-detect	UJ
Initial Calibration	coefficient <0.99	Detect	J
	%RSD >90%	Non-detect	R
	/0K3D >90 /0	Detect	J
	9/D > 209/ (increase in consitivity)	Non-detect	No Action
	%D >20% (increase in sensitivity)	Detect	J
Continuing Calibration	0/D > 200/ (degrees in consistivity)	Non-detect	UJ
	%D >20% (decrease in sensitivity)	Detect	J
	%D >90% (increase/decrease in	Non-detect	R
	sensitivity)	Detect	J

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD analysis was not performed on a sample location within this SDG.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

Please note: The LCS was spiked with a subset list of the compounds that were analyzed and reported for client samples. Although not a SW-846 method requirement, the current industry standard is to include all target compounds in the LCS spiking standard. This had no impact on the data usability; therefore, the data were not qualified.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not included for this parameter.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270C	Rep	orted	Performance Acceptable		Not Required	
	No	Yes	No	Yes	Requirea	
GAS CHROMATOGRAPHY/MASS SPECTROME	TRY (GC/	MS)				
Tier II Validation						
Holding times		Х		Х		
Reporting limits (units)		Х		Х		
Blanks						
A. Method blanks		Х		Х		
B. Equipment blanks		Х	Х			
Laboratory Control Sample (LCS) %R		Х		Х		
Laboratory Control Sample Duplicate(LCSD) %R		Х		Х		
LCS/LCSD Precision (RPD)		Х		Х		
Matrix Spike (MS) %R					Х	
Matrix Spike Duplicate(MSD) %R					Х	
MS/MSD Precision (RPD)					Х	
Field/Lab Duplicate (RPD)					Х	
Surrogate Spike Recoveries		Х		Х		
Dilution Factor		Х		Х		
Moisture Content					Х	
Tier III Validation		•				
System performance and column resolution		Х		Х		
Initial calibration %RSDs		Х		Х		
Continuing calibration RRFs		Х		Х		
Continuing calibration %Ds		Х	Х			
Instrument tune and performance check		Х		Х		
Ion abundance criteria for each instrument used		Х		Х		
Internal standard		Х		Х		
Compound identification and quantitation		•	•	•	•	
A.Reconstructed ion chromatograms		Х		Х		
B.Quantitation Reports		Х		Х		
C.RT of sample compounds within the established RT windows		Х		Х		
D.Quantitation transcriptions/calculations		Х		Х		
E.Reporting limits adjusted to reflect sample dilutions %RSD_Relative standard deviation		Х		Х		

%RSD Relative standard deviation %R Percent recovery RPD Relative percent difference

Percent recovery
Relative percent difference
Percent difference

%D

PESTICIDES ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8081	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
377-040 0001	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. System Performance

The instrument performance checks are performed to ensure adequate resolution and instrument sensitivity.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% is allowed or a correlation coefficient greater than 0.99 is allowed.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (15%).

All compounds associated with the calibrations were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. pesticide analysis requires that one of the two pesticide surrogate compounds exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD analysis was not performed on a sample location within this SDG.

7. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

Please note: The LCS was spiked with a subset list of the compounds that were analyzed and reported for client samples. Although not a SW-846 method requirement, the current industry standard is to include all target compounds in the LCS spiking standard. This had no impact on the data usability; therefore, the data were not qualified.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not included for this parameter.

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9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the percent difference (%D) of detected sample results must be less than 40%.

The column %D was within control limits for detected all detected compounds.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PESTICIDES

Pesticides; SW-846 8081	Rep	orted	Performance Acceptable		Not Required	
	No	Yes	No	Yes	Required	
GAS CHROMATOGRAPHY (GC/ECD)						
Tier II Validation						
Holding times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method blanks		Х		Х		
B. Equipment blanks		Х		Х		
Laboratory Control Sample (LCS)		Х		Х		
Laboratory Control Sample Duplicate(LCSD)					Х	
LCS/LCSD Precision (RPD)					Х	
Matrix Spike (MS)					Х	
Matrix Spike Duplicate(MSD)					Х	
MS/MSD Precision (RPD)					Х	
Field/Lab Duplicate (RPD)					Х	
Surrogate Spike Recoveries		Х		Х		
Column %D ≤ 40% (If dual column is performed for reporting-not confirmation)		Х		Х		
Dilution Factor		X		X		
Moisture Content					Х	
Tier III Validation						
Initial calibration %RSDs		Х		Х		
Continuing calibration %Ds		Х		Х		
System performance and column resolution		Х		Х		
Compound identification and quantitation		•		•		
A. Quantitation Reports		Х		Х		
B. RT of sample compounds within the established RT windows		Х		Х		
C. Identification/confirmation		Х		X		
D. Transcription/calculation errors present		Х		Х		
E. Reporting limits adjusted to reflect sample dilutions %RSD – relative standard deviation %R - percent		Х		Х		

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference.

POLYCHLORINATED BIPHENYLS (PCBs) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8082	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C
377-040 0002	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

A maximum RSD of 20% for each peak is allowed. Multiple-point calibrations were performed for Aroclor 1016 and 1260 only. Single-point calibrations were performed for the remaining Aroclors.

4.2 Continuing Calibration

All peaks associated with the opening continuing calibration standard must exhibit a percent difference (%D) less than the control limit (15%). The closing continuing calibration standard must exhibit a %D less than the control limit (50%)

All compounds associated with the calibrations were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. PCB analysis requires the surrogate compounds must exhibited recoveries within the method established acceptance limits.

All surrogate recoveries were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the method established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the method established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited recoveries within the control limits.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the method established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

A field duplicate was not included for this parameter.

9. Compound Identification

The retention times of all quantitated peaks must fall within the calculated retention time windows for both the primary and confirmation columns. When dual column analysis is performed the relative percent difference (%RPD) of detected sample results must be less than 40%.

The dual column analysis exhibited an acceptable %RPD between columns.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PCBs

PCBs; SW-846 8082	Reported			rmance eptable	Not
		Yes	No	Yes	Required
GAS CHROMATOGRAPHY (GC/ECD)					
Tier II Validation					
Holding times		Х		X	
Reporting limits (units)		Х		X	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate(LCSD) %R		Х		Х	
LCS/LCSD Precision (RPD)		Х		Х	
Matrix Spike (MS) %R					Х
Matrix Spike Duplicate(MSD) %R					Х
MS/MSD Precision (RPD)					Х
Field/Lab Duplicate (RPD)					Х
Surrogate Spike Recoveries		Х		Х	
Column (RPD) (If dual column is performed-not confirmation purposes only)		Х		Х	
Dilution Factor		X		X	
Moisture Content					Х
Tier III Validation					
Initial calibration %RSDs		Х		Х	
Continuing calibration %Ds		Х		Х	
System performance and column resolution		Х		Х	
Compound identification and quantitation		1			ı
A. Quantitation Reports		Х		Х	
B. RT of sample compounds within the established RT windows		Х		Х	
C. Pattern identification		Х		X	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions %RSD – relative standard deviation, %R - percent relative standard deviation.		Х		Х	

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference, %D – difference

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6020, 7470, EPA AVS/SEM, 350.1 and SM 2340C. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004 and professional judgement.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).
 - J The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
Soil		180 days from collection to analysis	Cool to <6 °C.
SW-846 7470	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the instrument detection limit (IDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
SW-08	Selenium Antimony		
SW-09	Selenium		
SW-09D	Selenium Thallium	Detected sample results <rl <bal<="" and="" td=""><td>"UB" at the RL</td></rl>	"UB" at the RL
SW-10	Copper Thallium		
SW-07	Thallium		

RL Reporting limit

The equipment blank contained low concentrations of certain metals; however, it was not compared to sediment sample results since the sediments analyzed for total metals were collected on a different day.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (AI), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries and RPD within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

A laboratory duplicate was not performed on a sample location within this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Arsenic	1.7	0.91 B	AC
	Barium	34.7	33.7	2.9%
	Boron	50.0	45.7	AC
	Chromium	3.8 B	5.1	AC
	Copper 1.6 B		1.6 B	AC
SD-09 04092009/ SD-09W 04092009	Iron	558	569	2.0%
	Manganese	131	128	2.3%
	Nickel	1.1	1.3	16.7%
	Lead	6.4	6.2	3.2%
	Antimony	1.1 B	1.1 B	AC
	Thallium	0.14 B	0.092 B	AC
	Zinc	10.7	11.4	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The sample locations associated with the deviant %D are also presented in the following table.

Sample Locations	Analytes	Serial Dilution (%D)
SW-08	Zinc	10.4%

The criteria used to evaluate the serial dilution are presented in the following table. In the case of a serial dilution deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
) UL	Detect	J

8. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000		orted		rmance ptable	Not
,	No	Yes	No	Yes	Required
Inductively Coupled Plasma-Atomic Emission Spec	trometry	(ICP)			
Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		Х		X	
Reporting limits (units)		Х		X	
Blanks					
A. Instrument Blanks		Х	Х		
B. Method Blanks		Х	X		
C. Equipment/Field Blanks					X
Laboratory Control Sample (LCS)		Х		Х	
Matrix Spike (MS) %R		Х		Χ	
Matrix Spike Duplicate (MSD) %R		Х		Х	
MS/MSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)		Х		Х	
ICP Serial Dilution		Х	Х		
Reporting Limit Verification		Х		Х	
Tier III Validation					
Initial Calibration Verification		Х		X	
Continuing Calibration Verification		Х		Х	
CRDL Standard		Х		Х	
ICP Interference Check		Х		Х	
Raw Data		Х		Х	
Transcription/calculation errors present		Х		Х	
Reporting limits adjusted to reflect sample dilutions		Х		Х	

%R Percent recovery
RPD Relative percent difference

SIMULTANEOUSLY EXTRACTED METALS (SEM) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA SEM 121/R-91-100	Solid	180 days to analysis 28 days to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the instrument detection limit (IDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the IDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
SD-08 04092009	Mercury	138%	136%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
MS/MSD percent recovery 30% to 74%	Detect	J
MC/MCD percent recovery (200/	Non-detect	R
MS/MSD percent recovery <30%	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
MS/MSD percent recovery > 125%	Detect	J

3.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

A laboratory duplicate was not performed on a sample location within this SDG.

4. Field Duplicate Analysis

The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil and sediment matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the reporting limit (RL), a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil and sediment matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SD-09 04092009/ SD-09D 04092009	Cadmium	0.024	0.028	AC
	Copper	1.0 B	1.1 B	AC
	Nickel	0.34	0.36	AC
	Lead	1.4	1.7	19.4%
	Zinc	9.8	10.6	7.8%
	Mercury	0.00046 U	0.00046 U	AC

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

6. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

The calculated %solids were acceptable with the exception of the sample location presented in the following table

Sample Location	%Solids
SD-07	9.9%
SD-08	11.0%
SD-09	13.6%
SD-09D	13.6%

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification	
Percent solids < 30%	Non-detect	UJ	
	Detect	J	

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SEM

SEM: EPA SEM 121/R-91-100	Rep	Reported		mance	Not
	No	Yes	No	Yes	Required
Inductively Coupled Plasma-Mass Spectrometry	(ICP/MS)				
Tier II Validation					
Holding Times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Instrument Blanks		Х		Х	
B. Method Blanks		Х		Х	
C. Equipment/Field Blanks					Х
Laboratory Control Sample (LCS)		Х		Х	
Laboratory Duplicate Sample		Х		Х	
Matrix Spike (MS) %R		Х	Х		
Matrix Spike Duplicate (MSD) %R		Х	Х		
MS/MSD Precision (RPD)		Х		Х	
Laboratory Duplicate Sample (RPD)					Х
Field Duplicate Sample (RPD)		Х		Х	
Tier III Validation					
Initial Calibration Verification		Х		Х	
Continuing Calibration Verification		Х		Х	
CRDL Standard		Х		Х	
ICP Interference Check		Х		Х	
Raw Data		Х		Х	
Transcription/calculation errors present		Х		Х	
Reporting limits adjusted to reflect sample dilutions		Х		Х	

%R RPD Percent recovery
Relative percent difference

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Hardness by SM2340C	Water	6 months from collection to analysis	Cooled @ <6°C; preserved to a pH of less than 2.
Ammonia-N by EPA 350.1	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
Acid Volatile Sulfide (AVS) by EPA AVS	Sediment	14 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All calibration standard recoveries were within the control limit.

4. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory qualifier "N" will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

The laboratory duplicate sample results exhibited RPD within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 100% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SD-09 04092009/ SD-09D 04092009	AVS	50.6	53.4	5.4%
SD-09 04092009/ Hardness		128	126	1.6%
SD-09W 04092009	Nitrogen as Ammonia	0.60 U	0.85 B	AC

AC Acceptable
NC Not compliant

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

7. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

The calculated %solids were acceptable with the exception of the sample location presented in the following table

Sample Location	%Solids		
SD-07	9.9%		
SD-08	11.0%		
SD-09	13.6%		
SD-09D	13.6%		

The criteria used to evaluate percent solids are presented in the following table. The qualifications are applied to the all sample results associated with sample location.

Sample Concentration	Sample Result	Qualification
Percent solids < 30%	Non-detect	UJ
	Detect	J

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM2340C; EPA 350.1; EPA AVS	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	Required
Miscellaneous Instrumentation					
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks		Х		Х	
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate(LCSD) %R					Х
LCS/LCSD Precision (RPD)					Х
Matrix Spike (MS) %R		Х		Х	
Matrix Spike Duplicate(MSD) %R		Х		Х	
Lab Duplicate (RPD)		Х		Х	
Field Duplicate (RPD)		Х		Х	
Dilution Factor		Х		Х	
Moisture Content		Х	Х		
Tier III Validation					
Initial calibration %RSD or correlation coefficient		Х		Х	
Continuing calibration %R		Х		Х	
Raw Data		Х		Х	
Transcription/calculation errors present				Х	
Reporting limits adjusted to reflect sample dilutions		Х		Х	

[%]RSD – relative standard deviation, %R - percent recovery, RPD - relative percent difference,

[%]D – difference

VALIDATION PERFORMED

BY: Jeffrey L. Davin

SIGNATURE:

DATE: April 21, 2015

PEER REVIEW: Dennis Capria

DATE: April 23, 2015

CHAIN OF CUSTODY/ CORRECTED SAMPLE ANALYSIS DATA SHEETS

ō Page THE LEADER IN ENVIRONMENTAL TESTING **TestAmerica** Analysis (Attach list if more space is needed) Date 4/9/09 Containers & Preservatives Jack Bruner Telephone Number (Area Code)/Fax Number 312-201 - 7188 Lab Contact Drinking Water? Yes □ No 文 Temperature on Receipt Carrier/Waybill Number Matrix Project Manager Site Contact Time State Zip Code Contract Purchase Order/Duote No. Date 87 TH F1 (Containers for each sample may be combined on one line) Sample I.D. No. and Description Custody Record Project Name and Location (State) Tota Tech . Vactu Mign Chain of TAL-4124 (1007) Client

Special Instructions/ Conditions of Receipt Chain of Custody Number 094672 タンダ/シス WS/WSD 7015 1/878 × × HOĐN IOH EONH メ ызгы nubres \prec lio2 × メ Sed. ήΑ 0440 0830 1040 0440 250 1115 100% 100 4/9/09 5D-09 P 9M-097 51-07 TO-MS SD-08 50-09 51-10 80 / MS 2240

Filme OKE (A fee may be assessed if samples are retained longer than 1 month) īme Time 601/7 Date Date Months Archive For Disposal By Lab 1. Received By 2. Received By 3. Received By ☐ Unknown ☐ Retum To Client 1600 Time Sample Disposal Time 4/9/PG □ Other. Date 21 Days Poison B ☐ 14 Days Skin Irritant ☐ 7 Days ☐ Flammable 24 Hours 48 Hours Possible Hazard Identification Turn Around Time Required 3. Relinquished By ☐ Non-Hazard Comments

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1040 140p

01-MS

ER-1

Client Sample ID: KR-1

GC/MS Semivolatiles

Lot-Sample #...: C9D110102-011 Work Order #...: K900P1AA Matrix..... WATER

Date Sampled...: 04/09/09 14:00 Date Received..: 04/10/09 09:45 MS Run #.....:

 Prep Date.....: 04/16/09
 Analysis Date..: 04/29/09

 Prep Batch #...: 9106283
 Analysis Time..: 09:30

Dilution Factor: 0.95 Initial Wgt/Vol: 1050 mL Final Wgt/Vol.: 10 mL

Analyst ID....: 003200 Instrument ID..: 731

Method.....: SW846 8270C

REPORTING

		REPORTIO	NG		
PARAMETER	RESULT	LIMIT	UNITS	MDL	
Acenaphthene	ND	1.9	ug/L	0.14	
Acenaphthylene	ND	1.9	ug/L	0.080	
Acetophenone	ND	9.5	ug/L	0.21	
Anthracene	ND	1.9	ug/L	0.99	
Atrazine	ND J	9.5	ug/L	0.19	
Benzo(a)anthracene	ND	1.9	ug/L	0.17	
Benzo(a)pyrene	ND	1.9	ug/L	0.11	
Benzo(b)fluoranthene	ND	1.9	ug/L	0.15	
Benzo(ghi)perylene	ND	1.9	ug/L	0.082	
Benzo(k) fluoranthene	ND	1.9	ug/L	0.16	
Benzaldehyde	5.3 J	9.5	ug/L	0.48	
1,1'-Biphenyl	ND	9.5	ug/L	0.15	
bis(2-Chloroethoxy)	ND	9.5	ug/L	0.13	
methane					
bis(2-Chloroethyl)-	ND	1.9	ug/L	0.25	
ether					
bis(2-Ethylhexyl)	ND	9.5	ug/L	0.44	
phthalate					
4-Bromophenyl phenyl	ND	9.5	ug/L	0.18	
ether					
Butyl benzyl phthalate	ND	9.5	ug/L	2.9	
Caprolactam	ND	48	ug/L	6.9	
Carbazole	ND	1.9	ug/L	0.13	
4-Chloroaniline	ND	9.5	ug/L	1.0	
4-Chloro-3-methylphenol	ND	9.5	ug/L	0.24	
2-Chloronaphthalene	ND	1.9	ug/L	0.14	
2-Chlorophenol	ND	9.5	ug/L	0.20	
4-Chlorophenyl phenyl	ND	9.5	ug/L	0.099	
ether					
Chrysene	ND	1.9	ug/L	0.10	
Dibenz(a,h)anthracene	ND	1.9	ug/L	0.12	
Dibenzofuran	ND	9.5	ug/L	0.18	
3,3'-Dichlorobenzidine	ND	9.5	ug/L	0.34	
2,4-Dichlorophenol	ND	1.9	ug/L	0.13	
Diethyl phthalate	ND	9.5	ug/L	0.43	
2,4-Dimethylphenol	ND	9.5	ug/L	0.076	
Dimethyl phthalate	ND	9.5	ug/L	0.13	
			٥.		

(Continued on next page)

Client Sample ID: KR-1

GC/MS Semivolatiles

Lot-Sample #...: C9D110102-011 Work Order #...: K900P1AA Matrix...... WATER

		REPORTIN	IG	
PARAMETER	RESULT	LIMIT	UNITS	MDL
Di-n-butyl phthalate	ND	9.5	ug/L	0.28
4,6-Dinitro-	ND	48	ug/L	7.4
2-methylphenol			-3, -	· · -
2,4-Dinitrophenol	ND	48	ug/L	5.8
2,4-Dinitrotoluene	ND	9.5	ug/L	0.16
2,6-Dinitrotoluene	ND	9.5	ug/L	0.18
Di-n-octyl phthalate	ND	9.5	ug/L	0.15
Fluoranthene	ND	1.9	ug/L	0.095
Fluorene	ND	1.9	ug/L	0.094
Hexachlorobenzene	ND	1.9	ug/L	0.17
Hexachlorobutadiene	ND	1.9	ug/L	0.12
Hexachlorocyclopenta-	ND	9.5	ug/L	0.11
diene			-	
Hexachloroethane	ND	9.5	ug/L	0.073
Indeno(1,2,3-cd)pyrene	ND	1.9	ug/L	0.15
Isophorone	ND	9.5	ug/L	0.27
2-Methylnaphthalene	ND	1.9	ug/L	0.15
2-Methylphenol	ND	9.5	ug/L	0.13
4-Methylphenol	ND	9.5	ug/L	0.17
Naphthalene	ND	1.9	ug/L	0.26
2-Nitroaniline	ND	48	ug/L	0.16
3-Nitroaniline	ND	48	ug/L	0.25
4-Nitroaniline	ND	48	ug/L	0.22
Nitrobenzene	ND	1.9	ug/L	0.17
2-Nitrophenol	ND	9.5	ug/L	0.13
4-Nitrophenol	ND	48	ug/L	6.7
N-Nitrosodi-n-propyl-	ND	1.9	ug/L	0.37
amine				
N-Nitrosodiphenylamine	ND	1.9	ug/L	0.46
2,2'-oxybis	ND	1.9	ug/L	0.33
(1-Chloropropane)				
Pentachlorophenol	ND	9.5	ug/L	1.8
Phenanthrene	ND	1.9	ug/L	0.27
Phenol	ND	1.9	ug/L	0.22
Pyrene	ND	1.9	ug/L	0.11
2,4,5-Trichloro-	ND	9.5	ug/L	0.14
phenol				
2,4,6-Trichloro-	ND	9.5	ug/L	0.086
phenol				

(Continued on next page)

Client Sample ID: ER-1

GC/MS Semivolatiles

Lot-Sample #...: C9D110102-011 Work Order #...: K900P1AA Matrix..... WATER

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
2,4,6-Tribromophenol	79	(33 - 122)
2-Fluorobiphenyl	85	(35 - 108)
2-Fluorophenol	77	(26 - 100)
Nitrobenzene-d5	83	(37 - 104)
Phenol-d5	81	(30 - 102)
Terphenyl-d14	94	(25 - 130)
NOTE(S):		

J Estimated result. Result is less than RL.

Client Sample ID: KR-1

GC Semivolatiles

Lot-Sample #: C9D110102-03	ll Work Order #: K900P1AC	Matrix: WATER
Date Sampled: 04/09/09	Date Received: 04/10/09	MS Run # 9103239
Prep Date: 04/13/09	Analysis Date: 04/15/09	
Prep Batch #: 9103396	Analysis Time: 21:04	
Dilution Factor: 0.94	<pre>Initial Wgt/Vol: 1060 mL</pre>	Final Wgt/Vol: 40 mL
Analyst ID: 402331	<pre>Instrument ID: C/D</pre>	
	7 7	

Method.....: SW846 8081A

		REPORTIN	īG	
PARAMETER	RESULT	LIMIT	UNITS	MDL
alpha-BHC	ND	0.047	ug/L	0.014
beta-BHC	ND	0.047	${\tt ug/L}$	0.014
delta-BHC	ND	0.047	\mathtt{ug}/\mathtt{L}	0.0089
gamma-BHC (Lindane)	ND	0.047	\mathtt{ug}/\mathtt{L}	0.014
Heptachlor	ND	0.047	ug/L	0.013
Aldrin	ND	0.047	ug/L	0.010
Heptachlor epoxide	ND	0.047	ug/L	0.0093
Endosulfan I	ND	0.047	ug/L	0.0070
Dieldrin	ND	0.047	ug/L	0.0075
4,4'-DDE	ND	0.047	ug/L	0.0064
Endrin	ND	0.047	ug/L	0.0072
Endrin ketone	ND	0.047	ug/L	0.0094
Endrin aldehyde	ND	0.047	ug/L	0.011
Endosulfan II	ND	0.047	ug/L	0.014
4,4'-DDD	ND	0.047	ug/L	0.0073
Endosulfan sulfate	ND	0.047	ug/L	0.015
4,4'-DDT	ND	0.047	ug/L	0.013
Methoxychlor	ND	0.094	ug/L	0.017
alpha-Chlordane	ND	0.047	ug/L	0.011
gamma-Chlordane	ND	0.047	ug/L	0.0071
Toxaphene	ND	1.9	ug/L	0.39
	PERCENT	RECOVERY	•	
SURROGATE	RECOVERY	LIMITS		
Tetrachloro-m-xylene	78	(45 - 13	0)	
		/ - 10	0.1	

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Tetrachloro-m-xylene	78	(45 - 130)
Decachlorobiphenyl	99	(45 - 130)

Client Sample ID: ER-1

GC Semivolatiles

Lot-Sample #: C9D110102-011	Work Order #: K900P1AD	Matrix WATER
Date Sampled: 04/09/09	Date Received: 04/10/09	MS Run #:
Prep Date: 04/13/09	Analysis Date: 04/16/09	
Prep Batch #: 9103400	Analysis Time: 20:57	

Dilution Factor: 0.94 Initial Wgt/Vol: 1060 mL Final Wgt/Vol.: 40 mL Analyst ID...: 402360 Instrument ID.:: S/T

Method.....: SW846 8082

		REPORTIN	īG	
PARAMETER	RESULT	LIMIT	UNITS	MDL
Aroclor 1016	N D	0.38	ug/L	0.095
Aroclor 1221	ND	0.38	$\mathtt{ug/L}$	0.094
Aroclor 1232	ND	0.38	\mathtt{ug}/\mathtt{L}	0.11
Aroclor 1242	ND	0.38	\mathtt{ug}/\mathtt{L}	0.070
Aroclor 1248	ND	0.38	ug/L	0.085
Aroclor 1254	ND	0.38	ug/L	0.086
Aroclor 1260	ND	0.38	ug/L	0.051
	PERCENT	RECOVERY	•	
SURROGATE	RECOVERY	LIMITS		
Tetrachloro-m-xylene	107	(35 - 14	0)	
Decachlorobiphenyl	116	(35 - 14	0)	

Client Sample ID: SD-07

TOTAL Metals

Lot-Sample #	.: C9D110102-	001		Matrix: SOLID
Date Sampled		Date Received:	04/10/09	
% Moisture	.: 90			
		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
		,		
Prep Batch #				
Cadmium	0.014 J	· ·	EPA SEM	05/01-05/06/09 K90X51AD
	1	Dilution Factor: 1	Analysis Time; 00:00	Analyst ID: 022952
		Instrument ID: TRACEICP	MS Run # 912101	8 MDL 0.00036
Copper	0.79 1 8, J	20.2 umoles/gm	EPA SEM	05/01-05/06/09 K90X51AC
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRACEICP	MS Run #: 912101	8 MDL 0.0089
Nickel	0.27	0.17 umoles/qm	EPA SEM	05/01-05/06/09 K90X51AF
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRACEICP	MS Run # 912101	•
Lead	0.61	0.0073 umoles/gm	EPA SEM	25/23 25/25/20 72275175
Leau	0.01	Dilution Factor: 1	Analysis Time: 00:00	05/01-05/06/09 K90X51AG
		Instrument ID.: TRACEICP	•	Analyst ID: 022952 8 MDL 0.0024
		Institute ID IRACEICE	MS Rull # 912101	5 MDL 0.0024
Zinc	8.6 J V	0.38 umoles/gm	EPA SEM	05/01-05/06/09 K90X51AH
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRACEICP	MS Run # 9121018	MDL 0.028
Prep Batch #	: 9124023			
Mercury	ND J	0.00063 umoles/gm	EPA SEM	05/04/09 K90X51AE
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 031043
		Instrument ID: HGHYDRA	MS Run # 9124014	4 MDL 0.000065

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SD-08

TOTAL Metals

Lot-Sample # Date Sampled * Moisture	: 04/09/09		ed: 04/10/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS	S METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #				
Cadmium	0.035 J	0.010 umole	es/gm RPASEM	05/01-05/06/09 K90X71AH
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRA	CEICP MS Run #: 912101	.0 MDL 0.00033
Copper	1.4 B,J		es/gm BPA SEM	05/01-05/06/09 K90X71AE
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRA	CEICP MS Run #: 912101	.8 MDL 0.0080
Nickel	0.39	0.15 umole	es/gm EPA SEM	05/01-05/06/09 K90X71AP
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRAG	CEICP MS Run #: 912101	.8 MDL 0.0044
Lead	1.8	0.0066 umole	es/gm EPA SEM	05/01-05/06/09 K90X71AT
		Dilution Factor: 1	Analysis Time: 00;00	Analyst ID: 022952
		Instrument ID.,: TRAG	CEICP MS Run #: 912101	8 MDL 0.0022
Zinc	16.4 J	0.35 umole	es/gm EPA SEM	05/01-05/06/09 K90X71AW
		Dilution Factor: 1	Analysis Time: 00:00	Analyst ID: 022952
		Instrument ID: TRAG	CEICP MS Run # 912101	.8 MDL 0.026
Prep Batch #	: 9124023			
Mercury	ND J	0.00056 umole	es/gm EPA SEM	05/04/09 K90X71AL
-		Dilution Factor: 1	Analysis Time: 00:00	, ,
		Instrument ID: HGHY	<u>-</u>	<u>-</u>

Results and reporting limits have been adjusted for dry weight.

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level,

Client Sample ID: SD-09

TOTAL Metals

Lot-Sample # Date Sampled % Moisture	: 04/09/09	003 Date Recei	ived: 04	1/10/09		Matrix:	SOLID
		REPORTING				PREPARATION-	WORK
PARAMETER	RESULT	LIMIT UNI	ITS M	METHOD		ANALYSIS DATE	ORDER #
Prep Batch #	: 9121031						
Cadmium	0.024 J	0.0082 umo	oles/gm E	EPA SEM		05/01-05/06/09	K90X91AD
	1	Dilution Factor: 1	. Ana	alysis Time: 0	0:00	Analyst ID	: 022952
		Instrument ID: T	RACEICP MS	Run #: 9	121018	MDL	: 0.00027
Copper	1.0-B,J	14.8 umo	oles/gm E	SPA SEM		05/01-05/06/09	K90X91AC
		Dilution Factor: 1	. Ana	alysis Time: 0	0:00	Analyst ID	: 022952
		Instrument ID: T	RACEICP MS	Run #: 9	121018	MDL	: 0.0065
Nickel	0.34	0.13 umo	oles/gm E	EPA SEM		05/01-05/06/09	K90X91AF
		Dilution Factor: 1	. Ana	alysis Time: 0	0:00	Analyst ID	: 022952
		Instrument ID: T	RACEICP MS	Run # 9	121018	MDL	: 0.0036
Lead	1.4	0.0053 umo	oles/gm E	RPA SEM		05/01-05/06/09	K90X91AG
		Dilution Factor: 1	Ana	alysis Time: 0	0:00	Analyst ID	: 022952
		Instrument ID: T	RACEICP MS	Run #: 9	121018	MDL	: 0.0018
Zinc	9.8 J . V	0.28 umo	oles/gm E	RPA SEM		05/01-05/06/09	K90X91AH
		Dilution Factor: 1	. Ana	alysis Time: 0	0:00	Analyst ID	: 022952
		Instrument ID: T	RACEICP MS	Run #: 9	121018	MDL	: 0.021
Prep Batch #	: 9124023						
Mercury	ND J	0.00046 umo	oles/gm E	EPA SEM		05/04/09	K90X91AE
		Dilution Factor: 1		alysis Time: 0		•	: 031043
		Instrument ID: H	GHYDRA MS	Run #: 9	124014	MDL.,,	: 0.000048

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SD-09D

TOTAL Metals

_	: C9D110102 : 04/09/09 : 86	-004 Date Received: 04/10/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #	: 9121031		
Cadmium	0.028 ј	0.0082 umoles/gm RPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID: TRACEICP MS Run #: 912	
Copper	1.1 -B,J	14.8 umoles/gm RPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID.:: TRACEICP MS Run # 9121	
Nickel	0.36	O.13 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID: TRACEICP MS Run # 9121	1 - 1
Lead	1.7	0.0053 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID: TRACEICP MS Run # 9121	
Zinc	10.6 → ↓	0.28 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID: TRACEICP MS Run #: 9121	
Prep Batch #.	: 9124023		
Mercury	ND J	0.00046 umoles/gm EPA SEM Dilution Factor: 1 Analysis Time: 00:0 Instrument ID: HGHYDRA MS Run #: 9124	•
NOTE(S):			

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SD-10

TOTAL Metals

Lot-Sample # Date Sampled % Moisture	: 04/09/09	Date Received:	04/10/09	Matrix: SOLID
PARAMETER	RESULT	REPORTING LIMIT UNITS	METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
Prep Batch #		UTIT	*ABTITOD	ANALISIS DATE ORDER #
Cadmium	0.00066 B	J 0.0015 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00 MS Run #: 9121018	05/01-05/06/09 K900B1AD Analyst ID: 022952 MDL: 0.000048
Copper	0.025 B,J	J 2.7 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	05/01-05/06/09 K900E1AC Analyst ID; 022952 8 MDL
Nickel	0.028	0.023 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	05/01-05/06/09 K900E1AF Analyst ID: 022952 MDL: 0.00066
Lead	0.028	0.00097 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00 MS Run #: 9121018	05/01-05/06/09 K900ElAG Analyst ID: 022952 MDL: 0.00032
Zinc	0.49 J	0.051 umoles/gm Dilution Factor: 1 Instrument ID: TRACEICP	Analysis Time: 00:00	05/01-05/06/09 K900B1AH Analyst ID: 022952 MDL: 0.0038
Prep Batch # Mercury	: 9124023 ND	0.000083 umoles/gm Dilution Factor: 1 Instrument ID: HGHYDRA	EPA SEM Analysis Time: 00:00 MS Run #: 9124014	05/04/09 K900E1AE Analyst ID: 031043 4 MDL

Results and reporting limits have been adjusted for dry weight.

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SW-07

TOTAL Metals

Lot-Sample #...: C9D110102-006 Matrix..... WATER Date Sampled...: 04/09/09 Date Received..: 04/10/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900G1AD Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 Instrument ID.,: ICPMS2 MS Run #...... 9117121 MDL..... 0.077 Arsenic 1.3 1.0 ug/L SW846 6020 04/27-05/04/09 K900GlAE Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 MS Run #..... 9117121 Instrument ID..: ICPMS2 MDL....: 0.14 Barium 81.1 10.0 uq/L SW846 6020 04/27-05/04/09 K900GlAF Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 MS Run #.....: 9117121 Instrument ID..: ICPMS2 MDL..... 0.076 Beryllium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900G1AG Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.068 Boron 423 5.0 uq/L SW846 6020 04/27-05/04/09 K900GLAH Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL....: 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K900G1AJ Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL.... 0,11 Chromium 6.5 ர 2.0 ug/L SW846 6020 04/27-05/04/09 K900G1AK Analysis Time..: 12:57 Dilution Factor: 1 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 2.4 😈 Copper 2.0 uq/L SW846 6020 04/27-05/04/09 K900G1AL Dilution Factor: 1 Analysis Time..: 12:57 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.14

(Continued on next page)

SW846 6020

Analysis Time..: 12:57

MS Run #..... 9117121

04/27-05/04/09 K900G1AM

Analyst ID....: 400149

MDL..... 7.4

uq/L

1480

50.0

Dilution Factor: 1

Instrument ID..: ICPMS2

Iron

Client Sample ID: SW-07

TOTAL Metals

Matrix....: WATER

MS Run #.....: 9117121 MDL..... 0.60

04/27-05/04/09 K900GLAV

Analyst ID....: 400149

Lot-Sample	# :	C9D110102-006
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	291	0.50 ug/L	SW846 6020	04/27-05/04/09 K900GlAN
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Nickel	4.3	1.0 ug/L	SW846 6020	04/27-05/04/09 K900GLAP
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Lead	6.9	1.0 ug/L	SW846 6020	04/27-05/04/09 K900GlAQ
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Antimony	0.92 ⅓ J	2.0 ug/L	SW846 6020	04/27-05/04/09 K900GlAR
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Selenium	1.6 B, J	5.0 ug/L	SW846 6020	04/27-05/04/09 K900GlAT
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Thallium	1.0 0.020 B UF	1.0 ug/L	SW846 6020	04/27-05/04/09 K900G1AU
		Dilution Factor: 1	Analysis Time: 12:57	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.018

Prep Batch #...: 9120031

19.3 _J

Mercury ND 0.20 ug/L SW846 7470A 04/30/09 K900G1AW Dilution Factor: 1 Analysis Time..: 09:19 Analyst ID....: 031043 Instrument ID..: HGHYDRA MS Run #.....: 9120021 MDL....: 0.038

SW846 6020

Analysis Time..: 12:57

ug/L

NOTE(S):

Zinc

5.0

Dilution Factor: 1

Instrument ID..: ICPMS2

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-08

TOTAL Metals

Lot-Sample #...: C9D110102-007 Matrix....: WATER Date Sampled...: 04/09/09 Date Received..: 04/10/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver 1.0 uq/L SW846 6020 04/27-05/04/09 K900K1AH Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 1.4 1.0 ug/L SW846 6020 04/27-05/04/09 K900KLAL Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MDL.,.... 0.14 MS Run #....: 9117121 Barium 55.0 10.0 ug/L SW846 6020 04/27-05/04/09 K900KlAP Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.076 Beryllium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900K1AT Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.068 Boron 52.7 5.0 ug/L SW846 6020 04/27-05/04/09 K900KlAW Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900K1A1 Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL.... 0.11 Chromium 5.3 T 2.0 ug/L SW846 6020 04/27-05/04/09 K900K1A4 Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.11 Copper 1.9 B, J 2.0 ug/L SW846 6020 04/27-05/04/09 K900K1A7 Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #...... 9117121 MDL..... 0.14 Iron 954 50.0 ug/L SW846 6020 04/27-05/04/09 K900K1CA Dilution Factor: 1 Analysis Time..: 13:01 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 7.4

(Continued on next page)

Client Sample ID: SW-08

TOTAL Metals

Matrix....: WATER

Lot-Sample #...: C9D110102-007

		REPORTING				PREPARATION-	WORK
PARAMETER	RESULT	LIMIT	UNITS	METHOD		ANALYSIS DATE	ORDER #
Manganese	97.4	0.50	ug/L	SW846 6020		04/27-05/04/09	K900K1CE
		Dilution Facto	or: 1	Analysis Time	13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	911712	1 MDL	.: 0.047
Nickel	1.3	1.0	ug/L	SW846 6020		04/27-05/04/09	K900K1CH
		Dilution Facto	or: 1	Analysis Time	13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	911712	1 MDL	.: 0.073
Lead	7.0	1.0	ug/L	SW846 6020		04/27-05/04/09	K900K1CL
		Dilution Facto	or: 1	Analysis Time	: 13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	911712	1 MDL,	.: 0.020
Antimony	2.0 0.74 B UB	2.0	ug/L	SW846 6020		04/27-05/04/09	K900K1CP
		Dilution Fact	or: 1	Analysis Time	: 13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	: 911712	1 MDL	.: 0.047
Selenium	5.0 0.61 B,J UE	5.0	ug/L	SW846 6020		04/27-05/04/09	K900K1CT
		Dilution Fact	or: 1	Analysis Time	: 13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	: 911712	1 MDL	.: 0.21
Thallium	ND	1.0	ug/L	SW846 6020		04/27-05/04/09	K900K1CW
		Dilution Fact	or: 1	Analysis Time	: 13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	: 911712	1 MDL	.: 0.018
Zinc	21.2 J	5.0	ug/L	SW846 6020		04/27-05/04/09	K900K1C1
		Dilution Fact	or: 1	Analysis Time	: 13:01	Analyst ID	.: 400149
		Instrument ID	: ICPMS2	MS Run #	: 911712	1 MDL	.: 0.60
n n 1	H 010003						
-	ı #: 9120031	0.00	/T	CM046 74707		04/20/00	K900K1C4
Mercury	ND	0.20	ug/L	SW846 7470A		04/30/09 Analyst ID	
		Dilution Fact		Analysis Time MS Run #			
		Instrument ID	: HGHYDKA	ms Kun #	: 912002	I PIDU.,	0.030

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

NOTE(S):

B Estimated result. Result is less than RL.

Client Sample ID: SW-09

TOTAL Metals

Lot-Sample #...: C9D110102-008 Matrix....: WATER

		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Prep Batch #	: 9117204			
Silver	ND	1.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AD
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.077
Arsenic	1.7	1.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAE
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.14
Barium	34.7	10.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAF
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL, 0,076
Beryllium	ND	1.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AG
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.068
Boron	50.0	5.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AH
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	1 MDL 0.42
Cadmium	ND	1.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AJ
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.11
Chromium	3.8 J	2.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AK
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.11
Copper	1.6 В, Ј Ј	2.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AL
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	-
Iron	558	50.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAM
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	-

(Continued on next page)

Client Sample ID: SW-09

TOTAL Metals

Lot-Sample	#: C9D110102	-008
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Matrix.					-	WATER
· ··· · · · · · · · · · · · · · · · ·		-	-	-		MAILA

		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	131	0.50 ug/L	SW846 6020	04/27-05/04/09 K900L1AN
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Nickel	1.1	1.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAP
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	=
Lead	6.4	1.0 ug/L	SW846 6020	04/27-05/04/09 K900L1AQ
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Antimony	1.1 B J	2.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAR
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Selenium 5	.0 0.65 B,J U	B 5.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAT
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Thallium	0.14 B J	1.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAU
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Zinc	10.7 J	5.0 ug/L	SW846 6020	04/27-05/04/09 K900LlAV
		Dilution Factor: 1	Analysis Time: 13:22	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117123	
Prep Batch #.	. 9120021			
Mercury	ND	0.20 ug/L	SW846 7470A	04/30/00 *********************************
		Dilution Factor: 1	Analysis Time: 09:25	04/30/09 K900L1AW
		Instrument ID.:: HGHYDRA	MS Run #: 9120021	Analyst ID: 031043
			MG Kull #: 9120021	MDL 0.038
NOTE(S).				

NOTE(S):

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: SW-09D

TOTAL Metals

Lot-Sample #...: C9D110102-009 Matrix....: WATER Date Sampled...: 04/09/09 Date Received..: 04/10/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver 1.0 ug/L 04/27-05/04/09 K900M1AD SW846 6020 Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 0.91 B J 1.0 uq/L SW846 6020 04/27-05/04/09 K900MLAE Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL..... 0.14 Barium 33.7 10.0 ug/L SW846 6020 04/27-05/04/09 K900MLAF Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.076 Beryllium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K900M1AG Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID. .: ICPM\$2 MS Run #...... 9117121 MDL..... 0.068 Boron 45.7 5.0 uq/L SW846 6020 04/27-05/04/09 K900MlAH Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K900M1AJ Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 5.1 J 2.0 ug/L SW846 6020 04/27-05/04/09 K900MlAK Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.... 9117121 MDL..... 0.11 1.6 B,J J Copper 2.0 ug/L SW846 6020 04/27-05/04/09 K900M1AL Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....; 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL....: 0.14 Iron 569 50.0 ug/L SW846 6020 04/27-05/04/09 K900MlAM Dilution Factor: 1 Analysis Time..: 13:26 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121

(Continued on next page)

MDL..... 7.4

Client Sample ID: SW-09D

TOTAL Metals

Lot-Sample #...: C9D110102-009 Matrix....: WATER

		REPORTING			PREPARATION-	WORK
PARAMETER	RESULT		UNITS	METHOD	ANALYSIS DATE	ORDER #
Manganese	128	0.50 t	ug/L	SW846 6020	04/27-05/04/09	
		Dilution Factor	: 1	Analysis Time: 13:26	Analyst ID	
		Instrument ID	: ICPMS2	MS Run # 911712	1 MDL	: 0.047
Nickel	1.3	1.0	ug/L	SW846 6020	04/27-05/04/09	K900M1 AP
		Dilution Factor	: 1	Analysis Time: 13:26	Analyst ID	
		Instrument ID	: ICPMS2	MS Run # 911712		
Lead	6.2	1.0	ıg/L	SW846 6020	04/27-05/04/09	K900M1A0
		Dilution Factor	: 1	Analysis Time: 13:26	Analyst ID	-
		Instrument ID	: ICPMS2	MS Run #: 911712	=	
Antimony	1.1 B J	2.0 u	ıg/L	SW846 6020	04/27-05/04/09	K900M1AR
		Dilution Factor:	: 1	Analysis Time: 13:26	Analyst ID	
		Instrument ID:	: ICPMS2	MS Run #: 911712		
Selenium 5.0	0.70 В, Ј ^U	B 5.0 u	ıg/L	SW846 6020	04/27-05/04/09	K900MlAT
		Dilution Factor:	: 1	Analysis Time: 13:26	Analyst ID	
		Instrument ID:	ICPMS2	MS Run #: 911712		
Thallium 1.0	0.092 B UB	1.0 u	ıg/L	SW846 6020	04/27-05/04/09	K900MLAU
		Dilution Factor:	1	Analysis Time: 13:26	Analyst ID	
		Instrument ID:	ICPMS2	MS Run # 911712		
Zinc	11.4 J	5.0 u	ıg/L	SW846 6020	04/27-05/04/09	K900MlAV
		Dilution Factor:	1	Analysis Time: 13:26	Analyst ID	
		Instrument ID:	ICPMS2	MS Run #: 911712		
Dren Batch #	. 0100001					
<pre>Prep Batch # Mercury</pre>	: 9120031 ND	0.00	/-			
	NL		g/L	SW846 7470A		K900M1AW
		Dilution Factor:	=	Analysis Time: 09:27	Analyst ID	_
		Instrument ID:	HGHYDRA	MS Run #: 9120021	. MDL	0.038
NOTE(S):						

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: SW-10

TOTAL Metals

Lot-Sample #...: C9D110102-010 Matrix....: WATER Date Sampled...: 04/09/09 Date Received..: 04/10/09 REPORTING PREPARATION-WORK RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900N1AD Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.077 Arsenic 1.3 1.0 ug/L SW846 6020 04/27-05/04/09 K900N1AR Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL....: 0.14 Barium 10.0 75.4 ug/L SW846 6020 04/27-05/04/09 K900N1AF Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.076 Beryllium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900N1AG Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL,.... 0.068 Boron 446 5.0 ug/L SW846 6020 04/27-05/04/09 K900N1AH Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND ug/L SW846 6020 04/27-05/04/09 K900N1AJ Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 4.9 ਰ 2.0 ug/L SW846 6020 04/27-05/04/09 K900N1AK Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL.... 0.11 Copper 2.0 1.1 B, J UB 2.0 ug/L SW846 6020 04/27-05/04/09 K900N1AL Dilution Factor: 1 Analysis Time..: 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.14 Iron 384 50 0 ug/L SW846 6020 04/27-05/04/09 K900NlAM Dilution Factor: 1 Analysis Time. : 13:45 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 7.4

(Continued on next page)

Client Sample ID: SW-10

TOTAL Metals

		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	175	0.50 ug/L	SW846 6020	04/27-05/04/09 K900N1AN
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.047
Nickel	3.5	1.0 ug/L	SW846 6020	04/27-05/04/09 K900NlAP
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 911712	
Lead	3.0	1.0 ug/L	SW846 6020	04/27-05/04/09 K900N1AQ
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Antimony	1.6 B J			
MICTIOHY	1.6 B	2.0 ug/L	SW846 6020	04/27-05/04/09 K900NLAR
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.047
Selenium	1.4 B,J ^J	5.0 ug/L	SW846 6020	04/27-05/04/09 K900N1AT
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	l MDL 0.21
Thallium 1.	0 0.046 B UB	1.0 ug/L	SW846 6020	04/27-05/04/09 K900N1AU
		Dilution Factor: 1	Analysis Time: 13:45	Analyst ID: 400149
		Instrument ID: ICPM\$2	MS Run # 911712:	-
Zinc	7.0 J	5.0 ug/L	SW846 6020	04/27 DE /04/00 F000X13X
		Dilution Factor: 1	Analysis Time: 13:45	04/27-05/04/09 K900N1AV
		Instrument ID. : ICPMS2	MS Run #: 9117123	Analyst ID: 400149
		TIBELUMENT ID : 1CFM32	MS Rull # 911/12.	MDL 0.60
Prep Batch #	.: 9120031			
Mercury	ND	0.20 ug/L	SW846 7470A	04/30/09 #0003135
1		Dilution Factor: 1	Analysis Time: 09:29	04/30/09 K900N1AW
		Instrument ID: HGHYDRA	MS Run #: 9120021	Analyst ID: 031043
			MS Rull #; 9120021	MDL 0.038
NOTE(S).				

NOTE(S):

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Client Sample ID: KR-1

TOTAL Metals

Lot-Sample #...: C9D110102-011 Matrix....: WATER Date Sampled...: 04/09/09 Date Received..: 04/10/09 REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS METHOD ANALYSIS DATE ORDER # Prep Batch #...: 9117204 Silver ND 1.0 ug/L SW846 6020 04/27-05/04/09 K900P1AG Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.077 Arsenic 0.52 B- J 1.0 ug/L SW846 6020 04/27-05/04/09 K900PlAH Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 MS Run #..... 9117121 Instrument ID. .: ICPMS2 MDL..... 0.14 Barium 0.19 B- J 10.0 ug/L SW846 6020 04/27-05/04/09 K900PlAJ Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 MS Run #..... 9117121 Instrument ID..: ICPMS2 MDL..... 0.076 Beryllium ND 1.0 uq/L SW846 6020 04/27-05/04/09 K900P1AK Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL..... 0.068 Boron 5.3 5.0 uq/L SW846 6020 04/27-05/04/09 K900PlAL Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID. .: ICPMS2 MS Run #..... 9117121 MDL..... 0.42 Cadmium ND 1.0 ug/L SW846 6020 04/27-05/04/09 K900P1AM Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Chromium 4.6 J 2.0 04/27-05/04/09 K900PlAN ug/L SW846 6020 Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121 MDL..... 0.11 Copper 4.2 J 2.0 ug/L SW846 6020 04/27-05/04/09 K900PlAP Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #.....: 9117121 MDL.... 0.14 Iron 856 50.0 ug/L SW846 6020 04/27-05/04/09 K900PlAQ Dilution Factor: 1 Analysis Time..: 13:49 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9117121

(Continued on next page)

MDL..... 7.4

Client Sample ID: KR-1

TOTAL Metals

Lot-Sample #: C9D110102-011 Matrix	: WATER
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		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Manganese	5.3	0.50 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.047
Nickel	26.1	1.0 ug/L	SW846 6020	04/27-05/04/09 K900PLA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	1 MDL 0.073
Lead	0.077 B- J	1.0 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Antimony	0.18 B J	2.0 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 9117123	•
Selenium	0.43 B,J	5.0 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 911712	
Thallium	0.029 B J	1.0 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 9117123	_
Zinc	5.6	5.0 ug/L	SW846 6020	04/27-05/04/09 K900PlA
		Dilution Factor: 1	Analysis Time: 13:49	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 9117123	MDL 0.60
Prep Batch #.	• 9120021			
Mercury	ND	0.20 ug/L	CMOAC BAGOS	2.4.7.2.4.2.
· · · · · · · · · · · · · · · · · · ·	MD	-3, -	SW846 7470A	04/30/09 K900P1A
		Dilution Factor: 1	Analysis Time: 09:30	Analyst ID: 031043
		Instrument ID: HGHYDRA	MS Run # 9120021	MDL 0.038
MOTTE/C).				

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

TetraTech Em IndianRidgeMarsh

Acid Volatile Sulfide

Lab Name:

TESTAMERICA PITTSBURGH

Method:

EPA

AVS

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D110102

Matrix: SOLID

AMBIENT MICRO-MIDI ACID PURGE

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SD-07	C9D110102 001	K90X51AJ	213 J	umoles/g 	1.6	5.0	1	4/23/2009 - 4/24/2009 00:00	9113350
SD-08	C9D110102 002	K90X71A1	72.4 J	umoles/g	1.4	4.5	1	4/23/2009 - 4/24/2009 00:00	9113350
SD-09	C9D110102 003	K90X91AJ	50.6	umoles/g 	1.1	3.7	1	4/23/2009 - 4/24/2009 00:00	9113350
SD-09D	C9D110102 004	K900C1AJ	53.4 <u>J</u>	umoles/g 	1.1	3.7	1	4/23/2009 ~ 4/24/2009 00:00	9113350
SD-10	C9D110102 005	K900E1AJ	6.7	umoles/g	0.21	0.67	1	4/23/2009 - 4/24/2009 00:00	9113350

$TetraTech\ Em\ IndianRidgeMarsh$

Hardness, as CaCO3

Lab Name:

TESTAMERICA PITTSBURGH

Method:

SM20

2340C

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D110102

Matrix: WATER

NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SW-07	C9D110102 006	K900G1AA	350	mg/L	7.7	25.0	5	5/12/2009 - 5/12/2009 00:00	9132290
SW-08	C9D110102 007	K900K1AA	122	mg/L	1.5	5.0	1	5/12/2009 - 5/12/2009 00:00	9132290
SW-09	C9D110102 008	K900L1AA	128	mg/L	1.5	5.0	1	5/12/2009 - 5/12/2009 00:00	9132290
SW-09D	C9D110102 009	K900M1AA	126	mg/L	1,5	5.0	1	5/12/2009 - 5/12/2009 00:00	9132290
SW-10	C9D110102 010	K900N1AA	340	mg/L	7.7	25.0	5	5/12/2009 - 5/12/2009 00:00	9132290
ER-1	C9D110102 011	K900P1AF	ND	mg/L	1.5	5.0	1	5/12/2009 - 5/12/2009 00:00	9132290

TetraTech Em IndianRidgeMarsh

Nitrogen, as Ammonia

Lab Name:

TESTAMERICA NORTH CANTO

Method:

SM18

4500 NH3 E

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D110102

Matrix: WATER

Distillation - 4500NH3B SM18

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SW-07	C9D110102 006	K900G1AX	4.5	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323
SW-08	C9D110102 007	K900K1C7	ND	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323
SW-09	C9D110102 008	K900L1AX	ND	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323
SW-09D	C9D110102 009	K900M1AX	0.85 5 J	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323
SW-10	C9D110102 010	K900N1AX	3.4	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323
ER-1	C9D110102 011	K900P1A2	1.7 B J	mg/L	0.60	2.0	1	5/6/2009 - 5/6/2009 00:00	9126323

TetraTech Em IndianRidgeMarsh

Percent Solids

Lab Name:

TESTAMERICA PITTSBURGH

Method:

SM20

2540G

Client Name:

Tetra Tech EM, Inc

Lot Number:

C9D110102

Matrix: SOLID

NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION

Client Sample ID	Sample Number	Workorder	Result	Units	Min. Detection Limit	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SD-07	C9D110102 001	K90X51AA	9.9	%	0.0		1	4/23/2009 - 4/24/2009 09:15	9113270
SD-08	C9D110102 002	K90X71AA	11.0	%	0.0		1	4/23/2009 - 4/24/2009 09:15	9113270
SD-09	C9D110102 003	K90X91AA	13.6	%	0.0		1	4/23/2009 - 4/24/2009 09:15	9113270
SD-09D	C9D110102 004	K900C1AA	13.6	%	0.0		1	4/23/2009 - 4/24/2009 09:15	9113270
SD-10	C9D110102 005	K900E1AA	74.7	%	0.0		1	4/23/2009 - 4/24/2009 09:15	9113270



Indian Ridge Marsh

Data Review

CHICAGO, ILLINOIS

Metals Analysis

SDG#C9E160102 and C9F170216

Analyses Performed By: TestAmerica Laboratories Pittsburgh, Pennsylvania

Report: #23467R Review Level: Tier III

Project: Cl001805.0001.00001

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # C9E160102 and C9F170216 for samples collected in association with the Indian Ridge Marsh Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

								Analysis	3	
SDG Number	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	svoc	AVS/ SEM	PEST/ PCB	MET	MISC
	IRM-V-1 05142009	C9E160102001	Vegetation	05/14/2009					Х	
C9E160102	IRM-V-2 05142009	C9E160102002	Vegetation	05/14/2009					Х	
C9E 160 102	IRM-V-3 05142009	C9E160102003	Vegetation	05/14/2009					Х	
	IRM-V-4 05142009	C9E160102004	Vegetation	05/14/2009					Х	
	IRM-V-1D 05142009	C9F170216001	Vegetation	05/14/2009					Х	
C9F170216	IRM-V-2D 05142009	C9F170216002	Vegetation	05/14/2009					Х	
C9F 1702 10	IRM-V-3D 05142009	C9F170216003	Vegetation	05/14/2009					Х	
	IRM-V-4D 05142009	C9F170216004	Vegetation	05/14/2009					Х	

Note:

^{1.} The samples with a "D" suffix are reanalyses of the original samples.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

			orted		mance ptable	Not
	Items Reviewed	No	Yes	No	Yes	Required
1.	Sample receipt condition		Х		Х	
2.	Requested analyses and sample results		Х		Х	
3.	Master tracking list		Х		Х	
4.	Methods of analysis		Х		Х	
5.	Reporting limits		Х		Х	
6.	Sample collection date		Х		Х	
7.	Laboratory sample received date		Х		Х	
8.	Sample preservation verification (as applicable)		Х		Х	
9.	Sample preparation/extraction/analysis dates		Х		Х	
10.	Fully executed Chain-of-Custody (COC) form		Х		Х	
11.	Narrative summary of QA or sample problems provided		Х		Х	
12.	Data Package Completeness and Compliance		Х		Х	

QA - Quality Assurance

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6020 and 7471. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004 and professional judgement.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
 - B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).
 - J The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
GVV 010 0020	Soil	180 days from collection to analysis	Cool to <6 °C.
SW-846 7470	Water	28 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool to <6 °C.

The analyses that exceeded the holding time are presented in the following table.

Sample Locations	Holding Time	Criteria
IRM-V-1D 05142009 IRM-V-2D 05142009		
IRM-V-3D 05142009	41 Days	28 Days
IRM-V-4D 05142009		

Sample results associated with sample locations analyzed by analytical method SW-846 7471 were qualified, as specified in the table below. All other holding times were met.

	Qualification			
Criteria	Detected Analytes	Non-detect Analytes		
Analysis completed less than two times holding time	J	UJ		

The laboratory noted the plant tissue samples were received at ambient temperature with no Ice. Based on professional judgment, there is no impact on the metals analyses and therefore, no qualification of the sample results was necessary, with the exception of mercury. Mercury tends to volatilize more readily; therefore, all results for mercury have been qualified as estimated (J).

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the instrument detection limit (IDL). The BAL is compared to the

associated sample results to determine the appropriate qualification of the sample results, if needed.

Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
IRM-V-1 05142009 IRM-V-2 05142009 IRM-V-3 05142009 IRM-V-4 05142009 IRM-V-1D 05142009 IRM-V-2D 05142009 IRM-V-3D 05142009 IRM-V-4D 05142009	Thallium	Detected sample results <rl <bal<="" and="" td=""><td>"UB" at the RL</td></rl>	"UB" at the RL

RL Reporting limit

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

3.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

4. Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries and RPD within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

A laboratory duplicate was not performed on a sample location within this SDG.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices and 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices or three times the RL is applied for soil matrices.

Field duplicate analysis was not performed on a sample location within this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

7. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution performed on sample location IRM-V-4 05142009 and IRM-V-4D 05142009 exhibited %D within the control limit.

8. System Performance and Overall Assessment

The laboratory qualified detects above detection limit but less than reporting limit with a "B" qualifier; these results were flagged with "J" during validation.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6000/7000	Rep	orted		rmance ptable	Not	
	No	Yes	No	Yes	Required	
Inductively Coupled Plasma-Atomic Emission Spec	trometry	(ICP)				
Atomic Absorption – Manual Cold Vapor (CV)						
Tier II Validation						
Holding Times		Х	Х			
Reporting limits (units)		Х		Х		
Blanks		-				
A. Instrument Blanks		Х		X		
B. Method Blanks		Х	Х			
C. Equipment/Field Blanks					Χ	
Laboratory Control Sample (LCS)		X		X		
Matrix Spike (MS) %R		X		X		
Matrix Spike Duplicate (MSD) %R		Х		Х		
MS/MSD Precision (RPD)		Х		Х		
Field/Lab Duplicate (RPD)					Χ	
ICP Serial Dilution		Х		Х		
Reporting Limit Verification		Х		X		
Tier III Validation						
Initial Calibration Verification		Х		Х		
Continuing Calibration Verification		Х		Х		
CRDL Standard		Х		Х		
ICP Interference Check		Х		Х		
Raw Data		Х		Х		
Transcription/calculation errors present		Х		Х		
Reporting limits adjusted to reflect sample dilutions		Х		Х		

%R Percent recovery
RPD Relative percent difference

VALIDATION PERFORMED

BY: Jeffrey L. Davin

SIGNATURE:

DATE: April 22, 2015

PEER REVIEW: Dennis Capria

DATE: April 24, 2015

CHAIN OF CUSTODY/ CORRECTED SAMPLE ANALYSIS DATA SHEETS

Please von duplierte Special Instructions/ Conditions of Receipt 200/ adequate mass Chain of Custody Number 094673 (A fee may be assessed if samples are retained Months longer than 1 month) + MS/MSD Sample (S) Date THE LEADER IN ENVIRONMENTAL TESTING **lestAmerica** Date 5/14 C9 Analysis (Attach list if more space is needed) ☐ Disposal By Lab ☐ Archive For OC Requirements (Specify) Containers & Preservatives Project Manager Tack Brunner 3. Received By 1. Received By 2. Received By Telephone Number (Area Code)/Fax Number 312 - 25 | -77 87 **EONH** Drinking Water? Yes □ No□ юзгн seudu∩ PoV Temperature on Receipt ☐ Unknown ☐ Return To Client 1400 Sample Disposa llos Carrier/Waybill Number Time Matrix .be2 Site Contact ΉA ☐ Other_ 200 333 Time Date 21 Days ☐ Poison B State Zp Code Date ☐ 14 Days S. Wacker 37THF Sample I.D. No. and Description (Containers for each sample may be combined on one line) Skin trritant Project Name and Location (State)

Project Name and Location (State)

Lydian Cide Marsh

Contract/Purchase Order/Quide No. ☐ 7 Days Tetra Tech Em ☐ Flammable **Custody Record** IRM - V-4 □ 48 Hours IRM - V-3 IRM- V-3 Possible Hazard Identification IRM-V-Turn Around Time Requires ished By N 3. Relinquished By □ Non-Hazard Chain of 24 Hours Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Client Sample ID: IRM-V-1

TOTAL Metals

Lot-Sample #...: C9E160102-001

Date Sampled...: 05/14/09

Date Received..: 05/15/09

Matrix....: BIOLOGIC

Matrix...: BIOLOGIC

		REPORTING	;			PREPARATION-	WORK
PARAMETER	RESULT	LIMIT	UNITS	METHOD		ANALYSIS DATE	ORDER #
Prep Batch #	: 9147550						
Zinc	11.7	0.50	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AA
		Dilution Fact	or: 1	Analysis Time:	01:55	Analyst ID	: 400149
		Instrument ID	: ICPMS2	MS Run #:	9147322	MDL	: 0.012
Beryllium	ND	0.10	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AC
•		Dilution Fact	or: 1	Analysis Time:	01:55	Analyst ID	: 400149
		Instrument ID	: ICPMS2	MS Run #:	9147322	MDL	: 0.0037
Nickel	0.11	0.10	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AD
		Dilution Fact		Analysis Time:	01:55	Analyst ID	: 400149
		Instrument ID	: ICPMS2	MS Run #:	9147322	MDL	: 0.0068
Copper	1.2	0.20	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AE
COPPOL		Dilution Fact		Analysis Time:		Analyst ID	
		Instrument ID		MS Run #:	9147322	MDL	: 0.0085
Antimony	0.030 B - J	0.20	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AF
INICIAOLI	0.030 2	Dilution Fact	- -	Analysis Time:		Analyst ID	
		Instrument ID	: ICPMS2	MS Run #:	9147322	MDL	: 0,0033
Arsenic	0.023 B J	0.10	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AG
ALBELLC	0.023 B	Dilution Fact		Analysis Time:		Analyst ID	
		Instrument ID		MS Run #:		-	
Cadmium	0.031 B J	0.10	mg/kg	SW846 6020		05/27-05/30/09	T.C68H1AH
Caomitum	0.031 -	Dilution Fact	_, _	Analysis Time:		Analyst ID	
		Instrument ID		MS Run #:		•	
Chromium	0.28 ភ	0.20	mg/kg	SW846 6020		05/27-05/30/09	LC68H1AJ
CHIOMEUM	0.26 6	Dilution Fact		Analysis Time:		Analyst ID	
		Instrument ID		MS Run #:		-	
T = = -3	0.26	0.10	mg/kg	SW846 6020		05/27-05/30/09	T.CERHIAY
Lead	0.36	Dilution Fact		Analysis Time:		Analyst ID	
		Instrument ID		MS Run #			
		TITO CT MINCTED ID	ICLIDE	TIME ACCOUNTS IN THE PERSON NAMED IN			

Client Sample ID: IRM-V-1

TOTAL Metals

Lot-Sample #.	Matrix: BIOLOGI			
PARAMETER Selenium	RESULT 0.066 B J	REPORTING LIMIT UNITS 0.50 mg/kg Dilution Factor: 1 Instrument ID.:: ICPMS2	METHOD SW846 6020 Analysis Time: 01:55 MS Run #: 914732	PREPARATION- WORK ANALYSIS DATE ORDER # 05/27-05/30/09 LC68H1AL Analyst ID: 400149 2 MDL: 0.041
Silver	0.0038-B J	0.10 mg/kg Dilution Factor: 1 Instrument ID: ICPMS2	SW846 6020 Analysis Time: 01:55 MS Run #: 914732	05/27-05/30/09 LC68H1AM Analyst ID: 400149 2 MDL: 0.0024
Thallium 0.	10 0.014 B, J U	B 0.10 mg/kg Dilution Factor: 1 Instrument ID: ICPMS2	SW846 6020 Analysis Time: 01:55 MS Run #: 914732	
Prep Batch #. Mercury	.: 9148018 ND	0.033 mg/kg Dilution Factor: 1 Instrument ID.:: HGHYDRA	SW846 7471A Analysis Time: 08:30 MS Run #: 914800	05/28/09 LC68H1AP Analyst ID: 031043

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-2

TOTAL Metals

Lot-Sample #...: C9E160102-002 Matrix....: BIOLOGIC

Date Sampled...: 05/14/09 Date Received..: 05/15/09

% Moisture....:

•			
	REPORTING		PREPARATION- WORK
RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
- 9147550			
	0.50 mg/kg	SW846 6020	05/27-05/30/09 LC68J1AA
	Dilution Factor: 1	Analysis Time: 01:59	Analyst ID: 400149
		S2 MS Run #: 914732	22 MDL 0.012
ND	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68J1AC
ND	- -	Analysis Time: 01:59	Analyst ID: 400149
		S2 MS Run #: 914732	22 MDL 0.0037
0 17	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68JLAD
0.17	J. J	Analysis Time: 01:59	Analyst ID: 400149
			22 MDL 0.0068
2.0	n 20 mar/ka	SW846 6020	05/27-05/30/09 LC68J1AE
2.0			Analyst ID: 400149
	-		22 MDL 0.0085
0 015 A J	0.20 mg/kg	sw846 6020	05/27-05/30/09 LC68J1AF
0.013 D			Analyst ID: 400149
			22 MDL 0.0033
ND	0 10 mg/kg	sw846 6020	05/27-05/30/09 LC68J1AG
1412		Analysis Time: 01:59	Analyst ID: 400149
		MS2 MS Run # 91473	22 MDL 0.016
NT	0 10 mg/kg	sw846 6020	05/27-05/30/09 LC68JlAH
ND	J	•	Analyst ID: 400149
			22 MDL 0.0091
0.44	0.20 mg/kg	sw846 6020	05/27-05/30/09 LC68JlAJ
0.44 0	- · · ·	Analysis Time: 01:59	Analyst ID: 400149
		MS2 MS Run # 91473	22 MDL 0.0080
0.15	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68J1AK
0.13		Analysis Time: 01:59	Analyst ID: 400149
		REPORTING LIMIT UNITS 19147550 9.5 0.50 0.50 0.10 0.10 0.10 0.10 0.10 0.	REPORTING LIMIT

Client Sample ID: IRM-V-2

TOTAL Metals

Lot-Sample #...: C9E160102-002

Matrix.	-	-	-	-	-	•	٠	•	:	BIOLOGI

PARAMETER Selenium	RESULT 0.062 B- J	REPORTING LIMIT UNITS 0.50 mg/kg Dilution Factor: 1 Instrument ID.:: ICPMS2	METHOD SW846 6020 Analysis Time: 01:59 MS Run #: 914732	•
Silver	ND	0.10 mg/kg Dilution Factor: 1 Instrument ID: ICPMS2	SW846 6020 Analysis Time: 01:59 MS Run #: 914732	
Thallium 0.10	0.0095 B, ਹ	UB 0.10 mg/kg Dilution Factor: 1 Instrument ID.:: ICPMS2	SW846 6020 Analysis Time: 01:59 MS Run #: 91473:	_
Prep Batch # Mercury	: 9148018 ND	0.033 mg/kg Dilution Factor: 1 Instrument ID: HGHYDRA	SW846 7471A Analysis Time: 08:32 MS Run #: 91480	<u>-</u>

B Estimated result. Result is less than RL.

NOTE(S):

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-3

TOTAL Metals

Lot-Sample #...: C9E160102-003 Matrix....: BIOLOGIC

% Moisture....:

		REPORTING		PREPARATION- WORK
PARAMETEF	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Prep Batch #		0.50 mg/kg	SW846 6020	05/27-05/30/09 LC68KLAA
Zinc	5.8	Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	•
		instrument ib icrasz	11D Rull #1111111 322132	
Beryllium	ND	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AC
•		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	22 MDL 0.0037
Nickel	0.19	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68KLAD
MICACI	0.13	Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID.:: ICPMS2	MS Run # 914732	
			,	
Copper	1.6	0.20 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AE
FE		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	22 MDL 0.0085
		<u>.</u>		
Antimony	0.0097 B	- , -	SW846 6020	05/27-05/30/09 LC68KLAF
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	22 MDL 0.0033
Arsenic	0.023 B J	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68KlAG
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 91473	22 MDL 0.016
		o 10 /1:	GM0.4.C. C0.0.0	05/07 05/20/00 1 <i>0</i> 60¥1NU
Cadmium	ND	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AH Analyst ID: 400149
		Dilution Factor: 1 Instrument ID: ICPMS2	Analysis Time: 02:03 MS Run #: 91473	<u>-</u>
		Institutent ID: ICFM52	M5 Rull # 314/5.	22 MDB
Chromium	0.27 5	0.20 mg/kg	SW846 6020	05/27-05/30/09 LC68KlAJ
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 91473	22 MDL 0.0080
7 3	0.10	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68KlAK
Lead	0.10	Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID.: ICPMS2	MS Run #: 91473	-
		Institutent ID: ICPMS2	rio Kuii # 514/5	

Client Sample ID: IRM-V-3

TOTAL Metals

Lot-Sample #...: C9E160102-003 Matrix....: BIOLOGI

		REPORTING		PREPARATION- WORK
PARAMETER	RESULT	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Selenium	0.081 B	0.50 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AL
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	2 MDL 0.041
Silver	ND	0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AM
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	2 MDL 0.0024
Thallium 0.1	0.0076 B, J	UB 0.10 mg/kg	SW846 6020	05/27-05/30/09 LC68K1AN
		Dilution Factor: 1	Analysis Time: 02:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 914732	2 MDL 0.0020
Prep Batch #.	: 9148018			
Mercury	ND	0.033 mg/kg	SW846 7471A	05/28/09 LC68KlAP
-		Dilution Factor: 1	Analysis Time: 08:34	Analyst ID: 031043
		Instrument ID: HGHYDRA	MS Run #: 914800	9 MDL 0.011
NOTE(S):				

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-4

TOTAL Metals

Lot-Sample #...: C9E160102-004 Matrix....: BIOLOGIC

% Moisture....:

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
1 "	07.48550				
Prep Batch # Zinc	7.5	0.50 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run #: 914732	05/27-05/30/09 LC68L1AA Analyst ID: 400149 22 MDL: 0.012
Beryllium	ND	0.10 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run #: 914732	05/27-05/30/09 LC68L1AE Analyst ID: 400149 22 MDL
Nickel	0.18	0.10 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run # 914732	05/27-05/30/09 LC68L1AH Analyst ID: 400149 22 MDL
Copper	1.8	0.20 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run # 914732	05/27-05/30/09 LC68L1AL Analyst ID: 400149 22 MDL: 0.0085
Antimony	0.0084 B J	0.20 Dilution Pacto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run # 914732	05/27-05/30/09 LC68L1AP Analyst ID: 400149 22 MDL 0.0033
Arsenic	ND	0.10 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run # 914732	05/27-05/30/09 LC68L1AT Analyst ID: 400149 22 MDL 0.016
Cadmium	0.015 B J	0.10 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run # 914732	05/27-05/30/09 LC68L1AW Analyst ID: 400149 22 MDL 0.0091
Chromium	0.32 ₹	0.20 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run #: 914732	05/27-05/30/09 LC68L1A1 Analyst ID: 400149 22 MDL
Lead	0.23	0.10 Dilution Facto Instrument ID.		SW846 6020 Analysis Time: 02:07 MS Run #: 914732	05/27-05/30/09 LC68L1A4 Analyst ID: 400149 22 MDL

Client Sample ID: IRM-V-4

TOTAL Metals

Matrix..... BIOLOGI

Lot-Sample #...: C9E160102-004

		REPORTIN	rG		PREPARATION- WORK
PARAMETER	RESULT	LIMIT	UNITS	METHOD	ANALYSIS DATE ORDER #
Selenium	ND	0.50	mg/kg	SW846 6020	05/27-05/30/09 LC68L1A7
		Dilution Fac	tor: 1	Analysis Time: 0	2:07 Analyst ID: 400149
		Instrument I	D: ICPMS2	MS Run # 9	47322 MDL 0.041
Silver	ND	0.10	mg/kg	SW846 6020	05/27-05/30/09 LC68L1CA
		Dilution Fac	tor: 1	Analysis Time: 0	2:07 Analyst ID: 400149
		Instrument I	D: ICPMS2	MS Run # 9	.47322 MDL 0.0024
Thallium 0.10	⁾ 0.0065 В, Ј	UB 0.10	mg/kg	SW846 6020	05/27-05/30/09 LC68L1CE
		Dilution Fac	tor: 1	Analysis Time: 0	2:07 Analyst ID: 400149
		Instrument I	D: ICPMS2	MS Run # 9	.47322 MDL 0.0020
Prep Batch #	.: 9148018				
Mercury	ND	0.033	mg/kg	SW846 7471A	05/28/09 L C68L 1C H
		Dilution Fac	tor: 1	Analysis Time: 0	3:35 Analyst ID: 031043
		Instrument I	D: HGHYDRA	MS Run # 9	48009 MDL 0.011
NOTE (S):					. <u>.</u>

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-1

TOTAL Metals

Matrix..... BIOLOGIC

Analyst ID....: 400149

MDL.... 0.0091

06/18-06/19/09 LE4KD1AJ

Analyst ID....: 400149

MDL..... 0.0080

06/18-06/19/09 LE4KD1AK

Analyst ID....: 400149

MDL....: 0.0034

Lot-Sample #...: C9F170216-001

Chromium

bea.

0.29 J

0.63

Date Sampled...: 05/14/09 Date Received..: 05/15/09 % Moisture....: REPORTING PREPARATION-WORK PARAMETER RESULT LIMIT UNITS ANALYSIS DATE ORDER # METHOD Prep Batch #...: 9169116 Zinc 18.0 0.50 mg/kg SW846 6020 06/18-06/19/09 LE4KD1AA Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 MS Run #..... 9169079 Instrument ID..: ICPM\$2 MDL..... 0.012 Beryllium ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KD1AC Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9169079 MDL..... 0.0037 0.082 B J Nickel 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KD1AD Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9169079 MDL..... 0.0068 Copper 1.3 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KDLAE Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 MS Run #..... 9169079 Instrument ID..: ICPMS2 MDL..... 0.0085 0.041 B J 0.20 Antimony mg/kg SW846 6020 06/18-06/19/09 LE4KD1AF Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9169079 MDL..... 0.0033 Arsenic ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KD1AG Dilution Factor: 1 Analysis Time..: 16:59 Analyst ID....: 400149 Instrument ID..: ICPMS2 MS Run #..... 9169079 MDL..... 0.016 0.035 B J Cadmium 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KD1AH

(Continued on next page)

Analysis Time..: 16:59

Analysis Time..: 16:59

Analysis Time..: 16:59

MS Run #..... 9169079

MS Run #..... 9169079

SW846 6020

SW846 6020

MS Run #..... 9169079

Dilution Factor: 1

Dilution Factor: 1

Dilution Factor: 1

0.20

0.10

Instrument ID..: ICPMS2

Instrument ID..: ICPM\$2

Instrument ID..: ICPMS2

mg/kg

mg/kg

Client Sample ID: IRM-V-1

TOTAL Metals

Lot-Sample #...: C9F170216-001 Matrix..... BIOLOGI

PARAMETER Selenium	RESULT 0.076 B J	REPORTING LIMIT 0.50	UNITS mg/kg	METHOD SW846 60:		PREPARATION- ANALYSIS DATE 06/18-06/19/09	
	r	ilution Facto	or: 1	Analysis Tim		Analyst ID	
	ı	instrument ID.	.: ICPMS2	MS Run #	: 9169079	MDL	: 0.041
Silver	0.0047 B J	0.10	mg/kg	SW846 602	20	06/18-06/19/09	LE4KD1AM
	I	ilution Facto	r: 1	Analysis Tim	ne: 16:59	Analyst ID	: 400149
	I	nstrument ID.	.: ICPMS2	MS Run #	: 9169079	MDL	: 0.0024
Thallium 0.10	6.011 B,J UE	0.10	mg/kg	SW846 602	20	06/18-06/19/09	LE4KD1AN
	Σ	ilution Facto	or: 1	Analysis Tim	ne: 16:59	Analyst ID	: 400149
	I	nstrument ID.	.: ICPMS2	MS Run #	: 9169079	MDL	: 0.0020
Prep Batch #	: 9175014						
Mercury	ND J	0.033	mg/kg	SW846 747	71A	06/24/09	LE4KD1AP
	Γ	ilution Facto	or: 1	Analysis Tim	ne: 08:28	Analyst ID	: 031043
	I	nstrument ID.	.: HGHYDRA	MS Run #	: 9175006	MDL	: 0.011

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-2

TOTAL Metals

Lot-Sample #...: C9F170216-002 Matrix....: BIOLOGIC **Date Sampled...:** 05/14/09 Date Received..: 05/15/09 % Moisture....:

		REPORTING		
PARAMETER	RESULT		MERIOD	PREPARATION- WORK
TIEGE IIII	KEDOLI	LIMIT UNITS	METHOD	ANALYSIS DATE ORDER #
Prep Batch #	: 9169116			
Zinc	6.8	0.50 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AA
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	
Beryllium	ND	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AC
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	
Nickel	0.12	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AD
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	-
				7.22
Copper	1.5	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AE
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL
Antimony	0.018 B J	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AF
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	-
Arsenic	0.039 B J	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AG
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	
Cadmium	ND	0.10/1		
Cadillulli	ND	0.10 mg/kg Dilution Factor: 1	SW846 6020	06/18-06/19/09 LE4KK1AH
		Instrument ID.: ICPMS2	Analysis Time: 17:03 MS Run #: 916907	Analyst ID: 400149
		Inscidment ID: ICPMS2	MS RULL # 91690/	9 MDL 0.0091
Chromium	0.31 o	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AJ
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	9 MDL 0.0080
Lead	0.14	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KK1AK
		Dilution Factor: 1	Analysis Time: 17:03	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	-

Client Sample ID: IRM-V-2

TOTAL Metals

Lot-Sample #.	:	C9F170216-002
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Matrix		•		-		-	•	:	BIOLOGI
--------	--	---	--	---	--	---	---	---	---------

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Selenium	0.059 B J	0.50	mg/kg	SW846 6020	06/18-06/19/09	LE4KKLAL
		Dilution Facto	r: 1	Analysis Time: 17:03	Analyst ID	.: 400149
		Instrument ID.	.: ICPMS2	MS Run # 91690	79 MDL	.: 0.041
Silver	ND	0.10	mg/kg	SW846 6020	06/18-06/19/09	LE4KK1AM
		Dilution Facto	r: 1	Analysis Time: 17:03	Analyst ID	.: 400149
		Instrument ID.	.: ICPMS2	MS Run #: 91690	79 MDL	.: 0.0024
Thallium 0.10	0.0064 B,J	UB 0.10	mg/kg	SW846 6020	06/18-06/19/09	LE4KKLAN
		Dilution Facto	r: 1	Analysis Time: 17:03	Analyst ID	: 400149
		Instrument ID.	.: ICPMS2	MS Run #: 91690	79 MDL	: 0.0020
Prep Batch #	: 9175014					
Mercury	N D J	0.033	mg/kg	SW846 7471A	06/24/09	LE4KK1AP
		Dilution Factor	r: 1	Analysis Time: 08:33	Analyst ID	: 031043
		Instrument ID.	.: HGHYDRA	MS Run # 91750	06 MDL	: 0.011

NOTE (S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-3

TOTAL Metals

Lot-Sample #...: C9F170216-003

Date Sampled...: 05/14/09

Date Received..: 05/15/09

Matrix....: BIOLOGIC

% Moisture....:

PARAMETER									
Prep Batch # : 9169116 Size			REPORTING				PREPARATION-	WORK	
2	PARAMETER	RESULT	LIMIT	UNITS	METHOD		ANALYSIS DATE	ORDER	#
Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149 MDL	Prep Batch #	: 9169116							
Instrument ID.: ICPMS2 MS Run #	Zinc	6.0	0.50	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	LAA
Beryllium			Dilution Facto	or: 1	Analysis Time:	17:08	Analyst ID	: 400149	9
Dilution Factor: 1			Instrument ID.	: ICPMS2	MS Run #:	9169079	MDL	: 0.012	
Nickel 0.17 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KNLAD MS Run # 17:08 Analyst ID 10:068	Beryllium	ND	0.10	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	1AC
Nickel 0.17			Dilution Facto	or: 1	Analysis Time:	17:08	Analyst ID	: 40014	9
Dilution Factor: 1 Analysis Time 17:08 Analyst ID 400149 MS Run # 9169079 MDL			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.003	7
Copper 1.7 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AE	Nickel	0.17	0.10	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	1AD
Copper 1.7 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AE Analysis Time.: 17:08 Analyst ID: 400149 MS Run #			Dilution Facto	or: 1	Analysis Time:	17:08	Analyst ID	: 400149	9
Dilution Factor: 1 Analysis Time 17:08 Analyst ID : 400149			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.0068	В
Dilution Factor: 1	Copper	1.7	0.20	mg/kg	SW846 6020		06/18-06/19/09	LB4KN	LAE
Antimony 0.014 B J 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AF Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149 MS Run #: 9169079 MDL			Dilution Facto	or: 1	Analysis Time:				
Dilution Factor: 1			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.008	5
Arsenic ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AG Dilution Factor: 1 Analysis Time 17:08 Analyst ID 400149 Instrument ID: ICPMS2 MS Run # 9169079 MDL 0.0016 Cadmium ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AH Dilution Factor: 1 Analysis Time 17:08 Analyst ID 400149 MS Run # 9169079 MDL 0.0016 Chromium 0.25 T 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AJ Dilution Factor: 1 Analysis Time 17:08 Analyst ID 400149 MS Run # 9169079 MDL 0.0091 Lead 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AK Dilution Factor: 1 Analysis Time 17:08 Analyst ID 400149 MS Run # 9169079 MDL 0.0080	Antimony	0.014 B J	0.20	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	LAF
Arsenic ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AG Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149 Instrument ID: ICPMS2 MS Run #: 9169079 MDL			Dilution Facto	or: 1	Analysis Time:		-		
Dilution Factor: 1			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.0033	3
Dilution Factor: 1	Arsenic	ND	0.10	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	1AG
Cadmium ND 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AH Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149 Instrument ID: ICPMS2 MS Run #: 9169079 MDL: 0.0091 Chromium 0.25 T 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AJ Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149 Instrument ID: ICPMS2 MS Run #: 9169079 MDL: 0.0080 Lead 0.10 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AK Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149			Dilution Facto	or: 1	Analysis Time:				
Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.016	
Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149	Cadmium	ND	0.10	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	1AH
Chromium 0.25 J 0.20 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AJ Dilution Factor: 1 Instrument ID.:: ICPMS2 MS Run # 9169079 MDL			Dilution Facto	or: 1	Analysis Time:				
Dilution Factor: 1 Analysis Time.: 17:08 Analyst ID: 400149 Instrument ID.: ICPMS2 MS Run #: 9169079 MDL 0.0080 Lead 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AK Dilution Factor: 1 Analysis Time.: 17:08 Analyst ID: 400149			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.0091	1
Instrument ID.:: ICPMS2 MS Run #: 9169079 MDL: 0.0080 Lead 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AK Dilution Factor: 1 Analysis Time.:: 17:08 Analyst ID: 400149	Chromium	0.25 J	0.20	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	L A J
Lead 0.10 mg/kg SW846 6020 06/18-06/19/09 LE4KN1AK Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149			Dilution Facto	or: 1	Analysis Time:				
Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.0080)
Dilution Factor: 1 Analysis Time: 17:08 Analyst ID: 400149	Lead	0.10	0.10	mg/kg	SW846 6020		06/18-06/19/09	LE4KN	LAK
Instrument ID.:: ICPMS2			Dilution Facto		Analysis Time:				
			Instrument ID.	.: ICPMS2	MS Run #:	9169079	MDL	: 0.0034	1

Client Sample ID: IRM-V-3

TOTAL Metals

Lot-Sample #...: C9F170216-003 Matrix.....: BIOLOGI

PARAMETER Selenium	RESULT 0.053 B J	REPORTING LIMIT UNITS 0.50 mg/kg Dilution Factor: 1 Instrument ID.:: ICPMS2	METHOD SW846 6020 Analysis Time: 17:08 MS Run #: 916907	PREPARATION - WORK ANALYSIS DATE ORDER # 06/18-06/19/09 LE4KN1AL Analyst ID: 400149 MDL: 0.041
Silver	ND	0.10 mg/kg Dilution Factor: 1 Instrument ID: ICPMS2	SW846 6020 Analysis Time: 17:08 MS Run #: 916907	06/18-06/19/09 LE4KN1AM Analyst ID: 400149 9 MDL: 0.0024
Thallium 0.10	0.0068 B,J	UB 0.10 mg/kg Dilution Factor: 1 Instrument ID: ICPMS2	SW846 6020 Analysis Time: 17:08 MS Run #: 916907	06/18-06/19/09 LE4KN1AN Analyst ID: 400149 9 MDL 0.0020
Prep Batch # Mercury	: 9175014 ND J	0.033 mg/kg Dilution Factor: 1 Instrument ID.:: HGHYDRA	SW846 7471A Analysis Time: 08:35 MS Run #: 917500	06/24/09 LE4KN1AP Analyst ID: 031043 6 MDL 0.011

NOTE(S):

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Client Sample ID: IRM-V-4

TOTAL Metals

Lot-Sample #...: C9F170216-004 Matrix....: BIOLOGIC

Date Sampled...: 05/14/09 **Date Received..:** 05/15/09

% Moisture....:

PARAMETER	RESULT	REPORTING LIMIT UNITS	METHOD	PREPARATION- WORK ANALYSIS DATE ORDER #
	•			
Prep Batch #	: 9169116			
Zinc	8.4	0.50 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AA
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL 0.012
Beryllium	ND	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AC
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL 0.0037
Nickel	0.11	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AD
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	-
Copper	1.8	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AE
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL 0.0085
Antimony	0.013 B J	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KQLAF
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL 0.0033
Arsenic	ND	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KO1AG
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run # 916907	9 MDL 0.016
Cadmium	0.016 B J	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AH
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	<u>-</u>
Chromium	0.30 	0.20 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AJ
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	-
Lead	0.23	0.10 mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AK
		Dilution Factor: 1	Analysis Time: 17:12	Analyst ID: 400149
		Instrument ID: ICPMS2	MS Run #: 916907	9 MDL 0.0034

Client Sample ID: IRM-V-4

TOTAL Metals

Lot-Sample #...: C9F170216-004 Matrix.....: BIOLOGI

		REPORTING			PREPARATION- WORK				
PARAMETER	RESULT	LIMIT	UNITS	METHOD	ANALYSIS DATE ORDER #				
Selenium	ND	0.50	mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AL				
		Dilution Facto	or: 1	Analysis Time: 17	:12 Analyst ID: 400149				
		Instrument ID.	.: ICPMS2	MS Run #: 910	59079 MDL 0.041				
Silver	N D	0.10	mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AM				
		Dilution Facto	r: 1	Analysis Time: 17	:12 Analyst ID: 400149				
		Instrument ID.	.: ICPMS2	MS Run # 910	59079 MDL 0.0024				
Thallium 0.10	0.0064 B,J	UB 0.10	mg/kg	SW846 6020	06/18-06/19/09 LE4KQ1AN				
		Dilution Facto	r: 1	Analysis Time: 17	:12 Analyst ID: 400149				
		Instrument ID.	.: ICPMS2	MS Run #: 916	59079 MDL 0.0020				
Prep Batch #	Prep Batch #: 9175014								
Mercury	ND ,T	0.033	mg/kg	SW846 7471A	06/24/09 LE4KQ1AP				
ner our j	0								
ner our y	G	Dilution Facto	or: 1	Analysis Time: 08:	:37 Analyst ID: 031043				

NOTE(S):

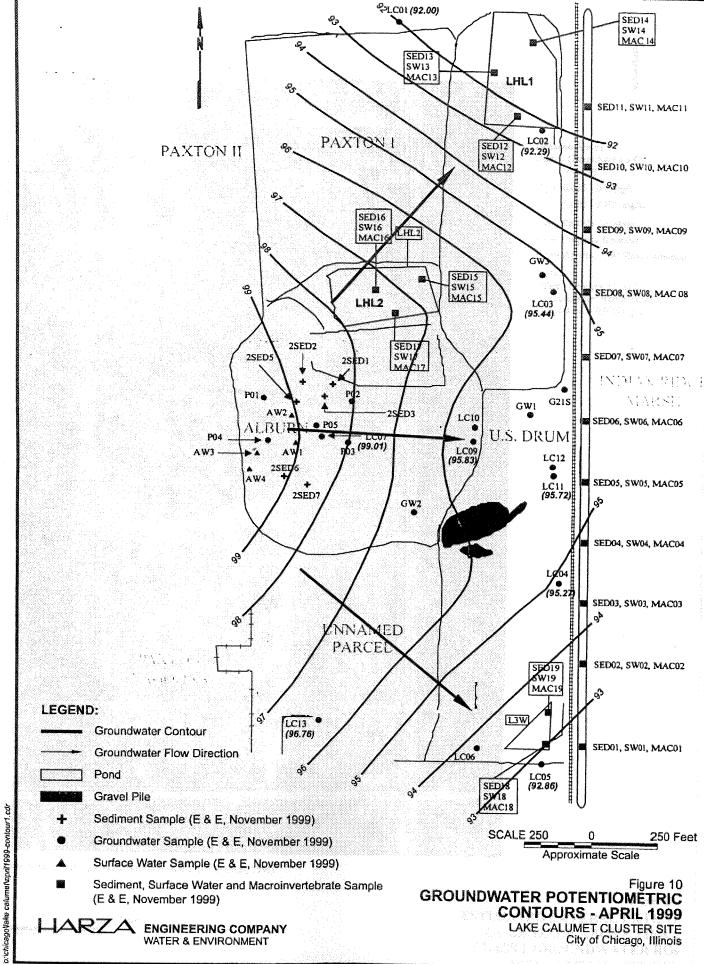
B Estimated result. Result is less than RL,

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

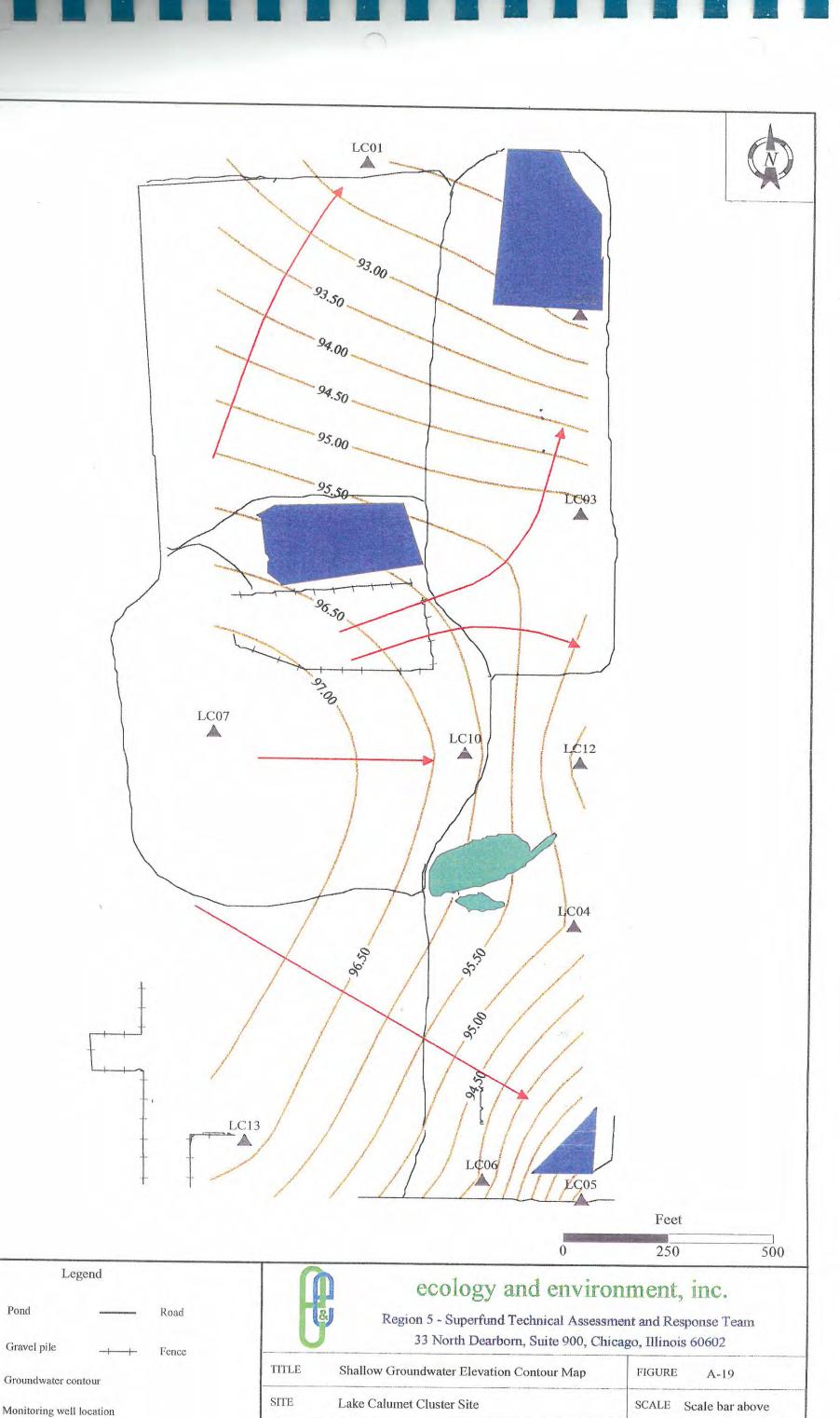


Appendix B

Historical Groundwater Potentiometric Surface Maps from Previous Reports



calumattapail 1999-contour 1, cdr



Pond

Groundwater flow direction

Note: Contour interval = 0.5 feet

CITY

SOURCE

Chicago

Ecology and Environment, Inc.

STATE

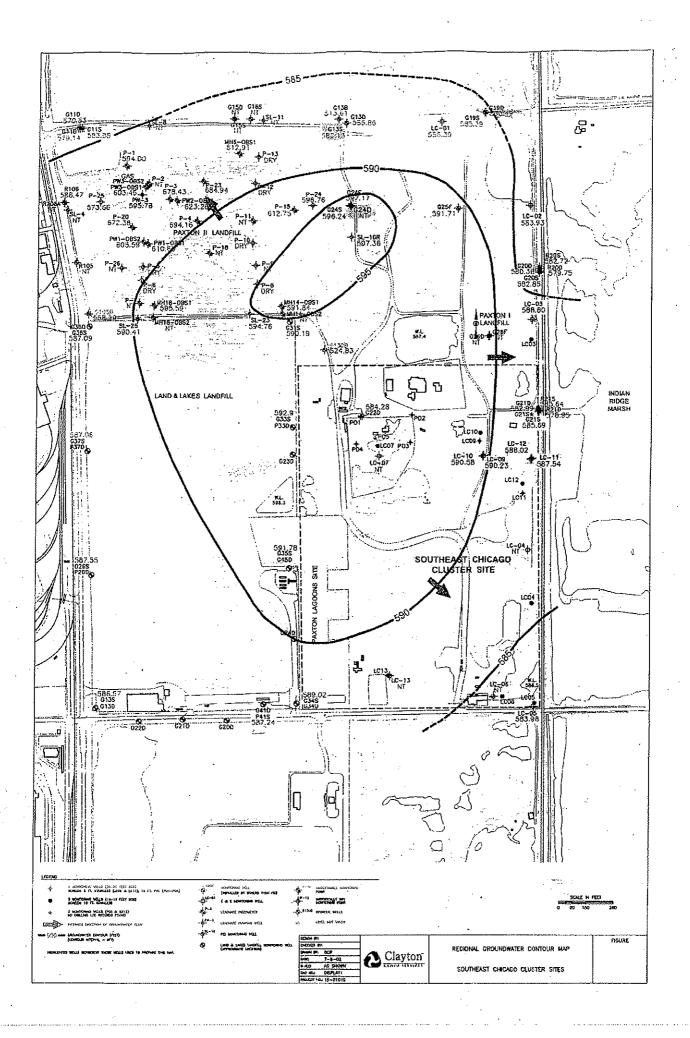
IL

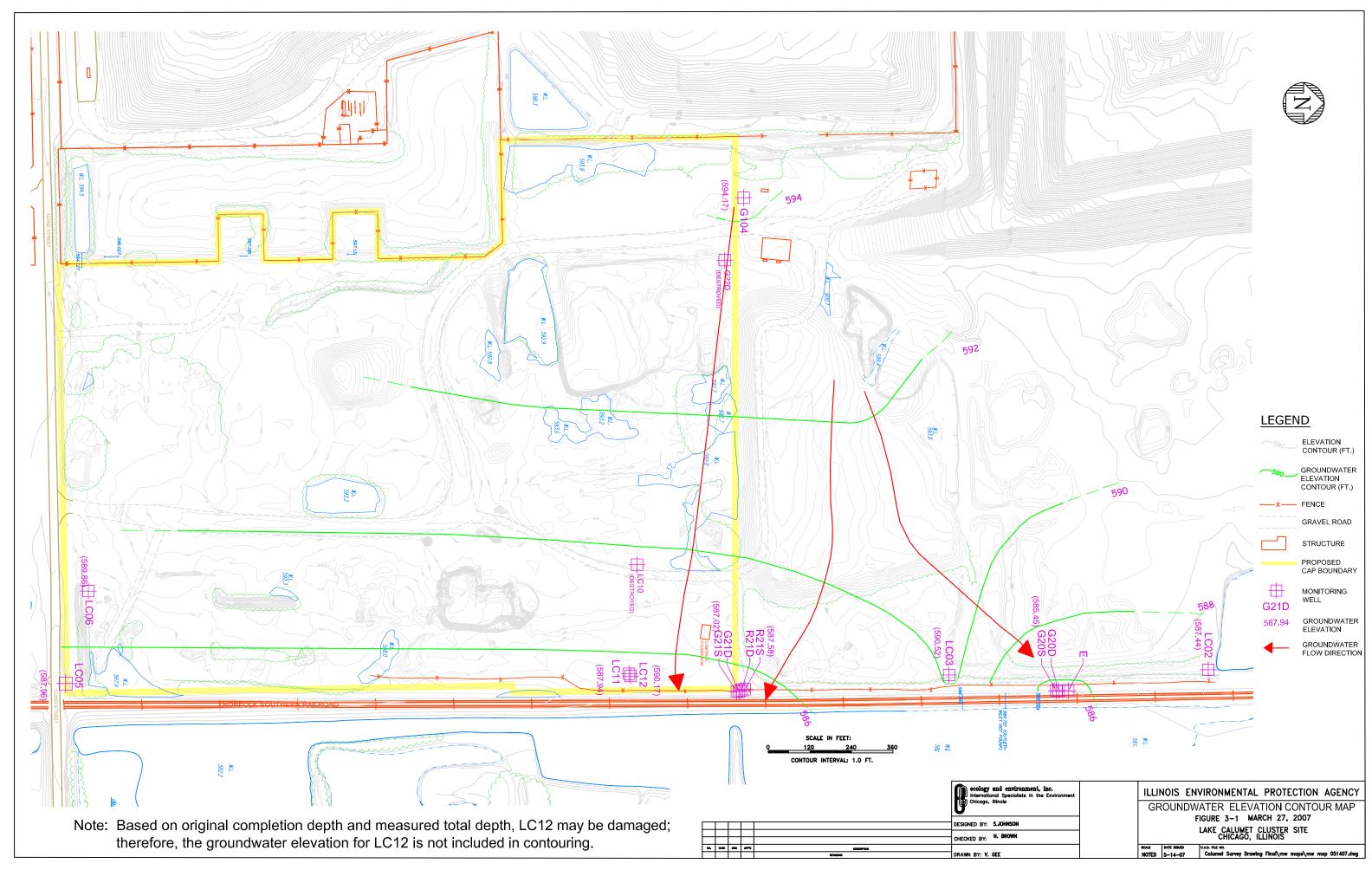
TDD

DATE

S05-9806-008

August 1999







Appendix C

Historical Boring Logs from Previous Reports

Attachment C

Well Records

Drilling Logs and Well Construction Reports For Installed Groundwater Wells (LC01 through LC07 and LC09 through LC13)



LEGEND

SAND & GRAVEL

FILL

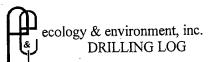
SAND

- E

SILTY CLAY

ORGANIC PEAT

GRAVEL



				DIGIDENTO BOO					
			G 1	Boring N	umber:		LC-01		
			Calum		e:		4/22/99		
	tion: _		9806-0	O la	ion Date:		4/22/99		
	:				ocation:		rth end of si	ite	
	ing Fir			Diming					
Гуре	of Rig	g:	CME		Elevation: _		96.21 fee	t	
Orill	et/Hel	per: <u>K</u>		Halliaway	Elevation:		98.40 feet	t	
Geol	ogist	J	oseph	Klemp	Boring:	1	6 feet		
Well	Casin	g(type &	& qty.)			N/A		
Scre	ened in	iterval(t	type &	r size) 2-inch stainless / 10 foot Lock No.	mber: Method:	Rotary w/H		auger	
Ann	ular M	aterial:		Drining	Metriod.				
				Grout- Bentonite					
				Seal- Bentonite Chips			Depth to Gi	roundwater	į
				Filter Pack- Sand		While drilling	ng: 7	'.5 feet (t.o.i.c)	bgs
	n 1		Comp	nante'		at completion	-	6.4 feet (t.o.i.c)	bgs
Vell	Devel	opment	Comm	ICHO.		after develo		n/a	bgs
		, ,							
			Recovery (inches)			PID	OVA (ppm)		
ទី	Elev. (feet)	Blow Count	(incl	Material Description		(ppm)	(ppm)	Remarks	
_	100	000	-						
٠,	-			FILL: Gray silty CLAY, some c-f gravel, little m-f sand.					
<u>_</u> -	0.5	2				}			
		3							
<u>, </u>	1.0						_		
٢.	1.5	3				0	0		
[:	1.5	1	16	✓Black Organic silty CLAY.					
	2.0_	5							
•		2		FILL: Brown silty CLAY, little m-f sand, trace m-f gravel.					
7:	2.5			FILL. Diowii siny Chiti, india in 1 saina, and in 1 garage					
	1	3				1			
	3.0	3		FILL: Debris material, wood, paper, glass, metal shavings.					
	3.5	,				0	0		
		3	16						
	4.0	J							
	1.	4							
	4.5	-							
	5.0	4							
	1	1,							
	5.5	4				0	1		
		4	14						
	6.0		1 17	•					
	6.5	12							Α.
	0.5	┪.							
	7.0	8							
		12	Ì					Ì	
14	7.5	- ·-	I			1.		Wet	
		7	10			- 1	90		
	8.0	-	+						
	8.5	16							
Ì									
?	9.0	6		(No Recovery)					
'		7		,		İ			
	9.5	4 .							
	10.0	9	0			-			
	10.0	+	-						
	10.:	12		FILL: Debris material, wood, plastic, glass, metal shavings, ceramics					
		22	-						
	11.0	0 22	İ					1	
		14					-		
	11	2				3	60	Wet	

Participation of

			<u> </u>				
Log	Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
2	(feet) 12.5	15	20	FILL: Debris material, paper, wood chips, rubber, glass, plastic.	10	20	
	13.0	7					
	13.5	7					
		5	6				
	14.0	4					
	14,5						Wood is "smoking" at removal from
	15.0	11					split spoon sampler.
	15.5	7			20	100	(venting methane?)
	16.0	<u> </u>	10	Boring Terminated at 16.0 feet.			
	16.5						
	17.0						
	17.5						
	18.0						
	18.5						
1.	19.0	1.					
	19.5						·
	20.0	1		·			
	20.5	7					
				3			
	21.0						
	21.5						
	22.0						
	22.5	5					
	23.0	<u> </u>					
	23.	5					
	24.0	0			İ		
	24.:	5	<u> </u>			<u> </u>	

Additional Comments:

Methane noted to be bubbling out of ground surface. OVA readings are above 100 ppm at the ground surface and at 0 ppm in ambient air (over 6-inches above ground). Headsapce on the boring hole during drilling reads 70 ppm on OVA.

and the second

Depth to Groundwater

n/a

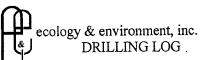
n/a

3.4 feet (t.o.i.c)

bgs

bgs

bgs



	o I Chud	er Sita	
Site Name: Lak	e Calumet Clusi	ici site -	
Location: Chi	cago, Cook Cou	nty, Illinois	
TDD:S0:	5-9806-008	·	
Drilling Firm: _	Patrick Drilling	<u> </u>	
Type of Rig:	CME-75		
Driller/Helper:	Kevin Hathawa	ıy I	
Geologist	Joseph Klemp	_	
Well Casing(type	& qty.):	2-inch stainless	
Screened interva	l(type & size)	2-inch stainless / 10 foot	
Annular Materia	l:		
	Grout-	Bentonite Slurry	
	Seal-	Bentonite Chips	

Pumps dry; recharges at approx. 1 ft/min

Filter Pack- Sand

Well Development Comments:

Boring Number:	LC-02	
Start Date:	4/23/99	
Completion Date:	4/24/99	
Boring Location:	Northeast Corner of Site	
	Southeast corner of pond LHL1	
Ground Elevation:	93.38 feet	
T.O.I.C. Elevation:	95.69 feet	
Depth of Boring:	16 feet	
Lock Number:	n/a	
Drilling Method:	Rotary w/Hollow stem augers.	

While drilling:

at completion:

after development:

Log	Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
	0.0	Count	2.0	FILL: 0 to 2 inch diameter GRAVEL (slag).			
<u>გ</u> _∎	0.5	4		The CV AV End of the American Service			Moist
		4		FILL: Brown to gray silty CLAY, little c-f sand, trace m-f gravel.	0	0	IAIOIST
	1.0	-					
_	1.5	7					
	2.0	5	18				
.		3					
	2.5	4					
	3.0	-		•			
	3.5	4			-		
	4.0	4	12	Gray m-f SAND, shells noted.	0	0	Wet
	:	2		Gray silty SAND.		Ì	
	4.5	-					
	5.0	3					
	5.5	3					1-inch clay lense
		3	18		0	0	noted at 5.6 feet.
	6.0	┨,	-				
	6.5	4					8
	7.0	2					
	7.5	2		(1-inch Black organic material noted at 7.5 feet)		-	
		3			0	0	
_ :	8:0	-	6				Dry
==	8.5	1		Black Organic Peat.			
==	9.0	1					
12-	-	4					
	9.5	-			0	0	
	10.0	2	10				
	10.5	2			_		
		1		Gray silty CLAY.			
	11.0	Ϋ.		Black Organic Peat.			
	11.5	1					
[=		2	20	•	0	0	

	, l	Blow	Recovery (inches)	ı	PID	OVA	
Log	Elev. (feet)	Count	Reco (incl	Material Description	PID (ppm)	OVA (ppm)	Remarks
= -==	12.5	1		Black Organic Peat			Dry
# <u>-</u>	13.0	1		Gray CLAY-trace-SILT	0	0	Diy
	13.0						
	13.5	1					
	14.0	1	19				
<u></u>	14.5	1		Black Organic Peat			
= =		2		Gray silty CLAY, trace c-f sand.	0	0	Dry
	15.0						
	15.5	3					•
	16.0	5	20				
-	l			Boring terminated at 16.0 feet			
	16.5						
	17.0						
İ							
	17.5						
	18.0						
	18.5						
	19.0		!				!
	19.5	i I					
							î
	20.0						
1	20.5					-	
		i					
	21.0						
	21.5						
	22.0						
	22.5	1		·		1	
	23.0						1
	23.5				ļ		
		1					
	24.0						
	24.5			,	<u> </u>		

Additional Comments:

Rain saturated ground in area at surface.

Depth to Groundwater

after development: 3.1 feet (T.O.I.C.) bgs

5.0 feet

2.9 feet (T.O.I.C)

bgs

bgs

ecology & environment, inc. DRILLING LOG

Site Name: Lake Calumet Cluste	er Site
Location: Chicago, Cook Coun	ty, Illinois
TDD: S05-9806-008	
Drilling Firm: Patrick Drilling	
Type of Rig: CME-75	
Driller/Helper: Kevin Hathaway	<u> </u>
Geologist Joseph Klemp	<u></u>
Well Casing(type & qty.):	2-inch stainless
Screened interval(type & size)	2-inch stainless / 10 feet
Annular Material:	
Grout-	bentonite slurry
Seal-	bentonite chips
Filter Pa	ck- sand
Well Development Comments:	

Boring Number:	LC-03
Start Date:	4/23/99
Completion Date:	4/23/99
Boring Location:	Northeast central part of site.
Ground Elevation:	95.85 feet
T.O.I.C. Elevation:	98.34 feet
Depth of Boring:	15.0 feet
Lock Number:	n/a
Drilling Method:	Rotary w/ hollow stem augers

While drilling:

at completion:

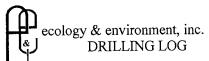
Log	Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
	0.0			FILL: Gray silty CLAY, some c-f gravel, trace m-f sand.			
	0.5	2			0	0	
	1.0	2					
	1.5	3					
	2.0	7	6				
	2.5	3		FILL: Gray silty CLAY, trace m-f gravel, trace c-f sand.	0	0	
	3.0_	4					
	3.5	6					
	4.0	7	13				
00	4.5	2		FILL: Black Gravel (Slag material), wood chips.	0	0	Wet
00	5.0	2					
00	5.5	3					
000000000000000000000000000000000000000	6.0	2	2				
000	6.5	5		FILL: Black SAND and GRAVEL, wood noted. (Slag material)			
0	7.0	9			0	0	
0	7.5	8					
0		40	12				
0	8.0	8					
0 0	8.5_	50			3	0	Wet
0000	9.0	00					
00	9.5		_				
0	10.0		8				
00	10.5	3					
00	11.0	24					
ဂ္ွင	11.5	49		FILL: Brown c-f SAND	0	0	Arkose appearance; Odor noted.
	12.0	40					Odor noted.

Log	Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
00	12.5	1		FILL: SAND and GRAVEL with wood chips.	0	0	
00	13.0	i					1
000000	13.5	7					
0	14.0	2	2			İ	Not sampled
?	14.5			Not sampled.			at 14-15 feet.
	15.0				-		
	15.5			Boring terminated at 15.0 feet.			
	16.0						
	16.5						
	17.0						
	17.5						
	18.0						
	18.5						
	19.0						
	19.5						
	20.0						
	20.5						
	21.0						
	21.5						1
	22.0						
	22.5						
	23.0						
	23.5						
	24.0						
	24.5						

Additional Comments:

OVA reads 100 ppm at boring opening with auger at 6-8' depth. PID reads zero ppm at boring opening with auger at 6-8' depth.

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Site Name: Lake Calumet Cluster Site Location: Chicago, Cook County, Illinois TDD: S05-9806-008 Drilling Firm: Patrick Drilling Type of Rig: CME-75 Driller/Helper: Kevin Hathaway Geologist Joseph Klemp Well Casing(type & qty.): 2-inch stainless Screened interval(type & size) 2-inch stainless / 10 foot Annular Material: Grout- Grout- Grout- Bentonite Slurry Seal- Bentonite Chips					Boring Number: Start Date: Completion Date: Boring Location: Ground Elevation: T.O.I.C. Elevation: Depth of Boring: Lock Number: Drilling Method:	4/21/99 4/21/99 South central on east side. 96.36 feet 98.47 feet			
Well	Develo	opment	Comr	Filter Pack- Sand		While drilling: at completion: after development:		5.0 bgs 3.2 (T.O.I.C.) bgs n/a bgs	
Log	Elev.	Blow Count	Recovery (inches)	Material Description		PID (ppm)	OVA (ppm)	Remarks	
	0.0	2		Brown silty CLAY, roots and organics noted. FILL: Black slag material, some plastic.		2	2		
	1.0	8		1 122. Ziusk Sing Illinovier, 30ine preside.			_		
	2.0	12	8						
	3.0	11				0-5	3	Water in splitspoon gravel size material	
	4.0	5	6						
	5.0 5.5	24 19					0		
	6.0	13	3			0 .			
	7.0	9							
	7.5	5	4			0	0		
	8.0	7							
	9.0	2 2							
	10.0	4	1				0		
	11.0	2 2		·				1"recovery of 1" diameter rock	
	12.0	2	1				<u> </u>	(Slag)	

Log	Elev. (feet)	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
	12.5			FILL: Black Plastic, wood chips, other debris.			
	13.0	4					PID acting up
	13.5	5		Gray m-f SAND.		0	High humidity.
	14.0	10	14				
	14.5	,					
	15.0	4					
	15.5	3					Large stone noted.
	16.0	5	16		10	7	1" diameter.
				Boring terminated at 16.0 feet.			
	16.5						
	17.0						
	17.5				enmonte de la company		
	18.0						
	18.5		.				
	19.0						
	19.5						
	20.0						
	20.5						
	21.0						
	21.5						
	22.0						
	22.5						
	23.0						
	23.5	ļ					
	24.0						
	24.5						

Depth to Groundwater



Site Name: Lake Calumet Cluster S	site
Location: Chicago, Cook County,	Illinois
TDD:S05-9806-008	
Drilling Firm: Patrick Drilling	
Type of Rig: CME-75	
Driller/Helper: Kevin Hathaway	<u></u>
Geologist Joseph Klemp	
Well Casing(type & qty.):	2-inch stainless
Screened interval(type & size)	2-inch stainless / 10 foot
Annular Material:	
Grout- B	entonite Slurry
Seal- B	entonnite chips
Filter Pack	- Sand
Well Development Comments:	Well goes dry, but recharges quickly.

Boring Number:	LC-05
Start Date:	4/26/99
Completion Date:	4/26/99
	Southeast corner of site near RR & 122nd St.
Ground Elevation:	98.83 feet 100.30 feet
Depth of Boring:	16.0 feet n/a
Drilling Method:	Rotary w/ Hollow stem augers

				Filter Pack- Sand		Depui to Gi		hae
			_	Well goes day but recharges quickly	While drilli at completion			bgs bgs
Well l	Develo	pment	Comm	ents:				bgs
						<u>. </u>		_
			20					1
5 D	Elev.	Blow	Recovery (inches)	· · · · · · · · · · · · · · · · · · ·	PID (ppm)	OVA (ppm)	Remarks	
<u>3</u> _	(feet)	Count	20	Material Description				
-	0.0			FILL: Gray SAND and GRAVEL	0	0		
0	0.5_	8						
0	1.0	3						
		2				1		ļ
0	1.5	-			j			1
0	2.0	2	13					
0	2.5	5						
1		2						
0	3.0	-			1			
	3.5	2		FILL: Brown silty CLAY, some c-f sand, some m-f gravel.	0	0		
100	-	10	10	FILL: Black SAND and GRAVEL		ì		
0	4.0	 	10					
0	4.5	6						
	5.0	11						
C	j	11			0	0		
0	5.5	-		The CLAV same of conditions in furavel			Moist	
•	6.0	13	14	FILL: Brown silty CLAY, some c-f sand. some m-f gravel.	-			
	6.5	5		FILL: Brown SAND, trace c-f gravel.				
	0.5_	14						
	7.0	-						
	7.5	27			0	0	Wet	
		30	18	FILL: BLACK silty SAND, little c-f gravel.			Wet	
0.0	8.0	5		FILL: Gray to Brown SAND and GRAVEL.				
00		'		(Slag and Brick)		. 0		
0	9.0	12			0	: 0	1	
0)	9		,	ļ		Wet	
00	9.5	-						
0000	10.0	4_	8					
100	10.4	7						
0	10	50						
000	11.0							
0,	10.6	5						
0,	2 12		6		0	0		
0	112.0	<u> </u>						

					-		
Log	Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
-	12.5						
?	13.0			(Not Sampled)			-
'	13.5			(140t Gamphea)			
	14.0						
00	14.5	11		FILL: Gray to Brown SAND & GRAVEL (Slag & Brick)			!
000	14.5 15.0 15.5	8			0	0	
0.0	15.5	7			-		
	16.0	9		Gray SAND, little m-f gravel.			
				Boring terminated at 16.0 feet.			Ì
	16.5						
	17.0	 					
	17.5	_					
	18.0						
	18.5						
	19.0						
	19.5	-				}	
	20.0	-					
	20.5	-					
	21.0	4					
	21.5						
	22.0	-					
	22.5						
	23.0						
	23.5	5					
	24.0	<u>)</u>					
	24.5	;					_!

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ecology & environment, inc. DRILLING LOG

				Bor Bor	ing Number:		LC-06	
Site N	lame:	Chica	Calum co. Co	El Ciusioi Sito	t Date:		4/26/99	
Local	ion: _		9 <u>806-0</u>		npletion Date: _		4/26/99	<u> </u>
Drilli	no Fin	m: P	atrick	Drilling Bot		Southeast cent north of fence		site
	of Rig		CME-	75			64 feet	
Drille	er/Help	per: K	evin I	lathaway	ound Elevation:		.51 feet	
Geol	ogist	J	oseph l	Klemp).I.C. Elevation: pth of Boring:		.0 feet	
Well	Casin	g(type ۂ	ጅ qty.)	2 Mon dan was	ck Number:		1/a	
		terval(t	ype &	2-11011 31411110337 10 1001	lling Method:		v/ Hollow s	tem augers
Annı	iiar Ma	aterial:		Grout- N/A				
				Seal- Bentonite chips			Depth to G	roundwater
				Filter Pack- Sand		While drilling	•) feet bgs
W-11	Develo	pment				at completio	n:	n/a bgs
						after develop	oment:	n/a bgs
						 		
	Elev.	Blow	Recovery (inches)			PID (ppm)	OVA (ppm)	Remarks
Log	(feet)	Count	<u> </u>	Material Description		(рриг)	(рр)	Gravel material
5	0.0			FILL: Gray SAND and GRAVEL.		0	0	appears to be slag
0	0.5	4						
0 0	1.0	50	12					
0	1.0							
0	1.5							
0	2.0							
	2.5							Drilled through slag.
?	3.0			(No Recovery)				
'	2.5							
	3.5	-						
2003/4500	4.0	ļ	0		·			
	4.5	2		FILL: Black Debris, sand and gravel, little glass, plastic, cloth, wood.		4	100	Moist
		7						
	5.0	-						
	5.5	7						
		6	12					
	6.0	4						
	6.5	- 7						Methane noted, OVA
	7.0	4				0	0	reads 100 ppm and
		2					}	drops quickly to zero.
	7.5	-					,	
	8.0	1	1			-		
0		2		FILL: SAND & GRAVEL, debris, some plastic, glass.		0		24.54
ő	8.5	3					0	Moist
0,	9.0	٠ ا						
OC	9.5	3		(1" gray silty clay lens notes at 9.5 feet)				
0,000	12:5	15	10					
00	10.0		10	FILL: Black SAND and GRAVEL (Slag material), little silt.				
0 0	0 10.5	27		FILL: DIACK SAIND AIRE GRAVED (STAR INATCHAI), THE STE				
0		16				0	0	
, o								
0	0 11.5	15						
o	12.0	10	12				<u> </u>	
	142.0							

and and the

7 7 7

	- 1	5.0	· · · · · · · · · · · · · · · · · · ·	i	į	
Elev.	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
12.5	6		FILL: Black SAND and GRAVEL (Slag material).		0	
13.0	4			0	O	ļ
13.5	6					1" Rock in
14.0	6	4				Splitspoon
			(No Recovery)			
			Boring terminated at 15.0 feet.			
:						
	ĺ					
İ				İ		
18.0						
18.5	 					
19.0						
19.5						
20.0						
20.5						
21.0						
21.5						
22.0						
22.5						
	ļ					
	!					
	(feet) 12.5 13.0 13.5 14.0 14.5 15.0 16.5 17.0 18.5 19.0 20.5 20.0 21.5 22.0 22.5 23.0 23.5 24.0	(feet) Count 12.5 6 13.0 4 13.5 6 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 19.5 20.0 20.5 21.0 22.0	12.5 6 13.0 4 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 20.5 20.0 20.5 21.0 22.5 22.0 22.5 23.0 23.5 24.0	12.5 6	12.5 6	13.0 4

OVA and PID headspace readings are zero at completion of boring.

ecology & environment, inc.
DRILLING LOG

				DRILLING LOG				
		Lako	Colum	net Cluster Site Bo	ring Number:		LC-07	
Site N	lame: ion:	Chica	go, Co	ook County, Illinois Sta	art Date:		4/21/99	
TOD		S05-	9806-0	008	mpletion Date: _		4/21/99	
Drilli	ng Fir	m: I	atrick	Drilling Bo	ring Location:	Alburn incin to existing w		
		;. —		-75		98.51		
Drille	er/Helt	er: I	Cevin l	natilaway	ound Elevation:	100.33		
	ogist	J	oseph	Klemp 1.	O.I.C. Elevation:) feet	
Well	Casin	g(type	& qty.):	epth of Boring:		√a ·	
Scree	ened in	terval(type &	size) 2-inch stainless / 10 foot	ock Number: rilling Method:	Rotary w/	Hollow ster	n augers
Annı	ılar Ma	aterial:						
				Grout- N/A Seal- Bentonite Chips			D .1	
				Seal- Bentonite Chips Filter Pack- Sand		i		oundwater
						While drillin		feet bgs feet (T.O.I.C.) bgs
Well:	Develo	pment	Comn	nents:		at completion		N/A bgs
						arter develop	inchi.	-5-
	1	·						
ĺ	Elev.	Blow	Recovery (inches)			PID	OVA (ppm)	Remarks
<u>1</u>	(fect)	Count	ĒĞ	Material Description		(ppm)	(ppm)	
_	0.0			FILL: Brown silty CLAY, some m-f sand, some m-f gravel.		9	4	CGI read zero for O2 and LEL.
	0.5	32						
		27						
-	1.0	1		DI LODATE (I we is) what a short day is]		
	1.5	50		FILL: Black GRAVEL (slag material), plastic, other debris.		2	1	Water noted in
			16					splitspoon
	2.0		 -					
7	2.5	11						Hit large boulder
		13						1
	3.0							
	3.5	13						
	١.,	8	1	glass noted at 4.0 feet		2	1	
	4.0	-	_					
	4.5	5	1					
	٤,	2						
	5.0_	┪.	ĺ					
	5.5	1						
		1	0.5	slag material noted at 6.0 feet		-		
	6.0	2						
	6.5	1 2						
	7.0	i						1
2		1						
	7.5	4	0					
	8.0	3	"			-		
		3		FILL: Black glass, plastic, wood, other debris.		20	3.5	
	8.5	_						
	9.0	5						
		3	ĺ					
	9.5	-						
	10.0	1	4					
		1					1	
	10.5	<u> </u>				15	2	
	11.0	2				1	1 -	
	J	2					i	
	1114	5 4	1			!	1	i

60	Elev.	Blow	Recovery (inches)		PID (ppm)	OVA (ppm)	Remarks
Log	(feet) 12.5	Count 1	25	Material Description FILL: Black plastic, wood, glass, other debris.	(ppm)	(ppm)	Remarks
				TILL. Diack plastic, wood, glass, other desire.			
	13.0	,					
	13.5	1			1	1	
	14.0			Black Organic silty CLAY, roots noted, some black sand.	1	•	
	14.5			Boring terminated at 14.0 feet.			
	15.0	Ì					
	ĺ						
	15.5						
	16.0						
	16.5						
	17.0						
	17.5						
	18.0						
		İ					
	18.5	ļ		\ 		į	
	19.0						
	19.5						
	20.0						
	20.5						
	21.0						
	21.5						
		!					
	22.0						
	22.5						
i	23.0						
	23.5						
	24.0	İ					<u> </u>
	24.5						Î L

Additional Comments: All readings taken with CGI were zero, throughout boring.

At completion OVA read 7 ppm and PID read 6 ppm at boring opening.

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ecology & environment, inc.
DRILLING LOG

				Diditing noo				
Site 1	Jame:	Lake	Calun		oring Number:		LC-09	
Loca	ion: .	Chica	ago, C	ook County, Illinois St	art Date:		4/20/99	
TDD		S05-	9806-0	008C	ompletion Date:		4/20/99	
Drilli	ng Fir	m: _1	Patrick	<u>Drilling</u> Bo	oring Location:	Central	part of site.	
	of Rig		CME	2-75	_	0	7.76 feet	
Drille	r/Hel	per: I	Kevin :	Hadiawaj	round Elevation:			
	ogist			Klemp T.	O.I.C. Elevation:		0.03 feet	
		g(type	& qty.)·	epth of Boring:		20.0 feet n/a	
Scree	ned in	iterval(type &	size) 2-inch stainless / 10 foot Lo	ock Number:	D -4 / 1		
		aterial:	_	D	rilling Method:	Rotary w/ F	tollow stem	augers.
				Grout- Bentonite Grout		1		
				Seal- Bentonite chips			Depth to G	roundwater
				Filter Pack- Sand		While drilling	ng. 7.0	feet bgs
Well	Develo	pment	Comm	nents:		at completion	-	feet (T.O.I.C.) bgs
W CII						after develo		3.9 feet (T.O.I.C.) bgs
Γ		l	50		-			
60	Elev.	Blow	Recovery (inches)			PID (ppm)	cgi (LEL)	Remarks
Log	(fcet)	Count	28.⊕	Material Description	avinge	(Pim)	LULLI	
	0.0	ī Ī	!	FILL: Brown to Black silty CLAY, some wood chips, glass, metal sha	aviligs.	1.5	0	
	0.5	2						
	1.0	2						
		3						
	1.5	ł						
	2.0	2	12					
		5						
	2.5							
	3.0	4						
	3.0	,	į					
	3.5	3						
	١.,	3	2				}	
	4.0		1-					
	4.5	2						
		2	İ	,				
	5.0	1						
	5.5_	3	j					
	5.5_	1 ,	1			0.5	0	
1	6,0	2	6					
	! !	1						
	6.5	┨ .		(No Recovery)				
	7.0	2						
?		1.						ŀ
	7.5	1						
	8.0	1	0			_		
	0.0	-	†	FILL: Cloth, wood, plastic material, and other debris.		0		100% of LEL
	8.5	4	1	FILE. Cloin, wood, prastic material, and other debris.				Wet
		6						1,700
	9.0	↓ Ŭ						
	9.5	4					!	
	7:5	1						
	10.0	9	6			-	ì	
		5						
	10.5	1		(No Recovery)				
	11.0	6						
?	12.0	3						
	11.5	,						
		3	0					
L	12.0		<u></u>	<u> </u>		1		

	i		2.0				
Log	Elev. (feet)	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
	12.5	5 3		FILL: Debris; plastic, wood, ceramics.	2	0	
	13.0						
	13.5	50					
	14.0		6				
	14.5	9					
	15.0	8					
	15.5	4					
	16.0	3	8				
	16.5	8		FILL: Debris; wood, plastic, paper.			
	17.0	10					
	17.5	9					
	18.0	11	12	Gray m-f SAND			
		12		FILL: Debris; wood, metal, paper.			
	18.5	7		7 7 1			
	19.0	6					
	19.5	6	16	Gray silty CLAY, trace m-f sand.			
==	20.0		10		•		
	20.5						
	21.0						
	21.5						;
	22.0			,			~
	22.5						
	23.0						
	23.5						
	24.0						
	24.5						

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The second second

ecology & environment, in DRILLING LOG
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C:4-	Marmar	Lake	Calum	et Cluster Site	Boring Number:		LC-				
Loca	name.	Chica	ago, Co	ok County, Illinois							
TDI):	S05-	9806-0	08	Completion Date		4/20/99 Central part of site East of Album incinerator area. 100.00 feet				
			Patrick	Drilling	Boring Location:	Album inc					
Тур	e of Ri	g:	CME		Ground Elevation	n. 1					
	ler/Hel _! logist			Hathaway / Klemp	T.O.I.C. Elevation		97.72 fee	t			
		g(type			Depth of Boring:		15.0 fee	t			
		iterval(i				Potent	n/a w/ Hollow st	tom auters			
Ann	ular M	aterial:			Drilling Method:	Kotary	W/ Hollow Si	tem augers.			
				Grout- Bentonite Seal- Bentonite Chips							
				Filter Pack- Sand				Groundwater	Į		
						While dri		7.0 feet n∕a	bgs bgs		
Well	Develo	opment	Comm	ents:		at comple		3.3 feet (T.O.I.C.)	bgs		
	!		<u>5</u> .8								
Log	Elev. (feet)	Blow Count	Recovery (inches)	Material Description		PID (ppm)	OVA (ppm)	Remarks			
	0.0	Count	† "								
	0.5										
	0.5	1									
	1.0	-									
	1.5										
	2.0										
		1									
	2.5	-				l 					
	3.0										
	3.5										
	İ										
	4.0										
	4.5										
	5.0										
		1		Blind	rilled to 15.0 feet depth.						
	5.5	-									
	6.0	-			·						
	6.5										
_											
=	- 1	1									
	7.5	-									
	8.0	_					ĺ				
	8.5					1					
		1									
	9.0	-									
	9.5										
	10.0										
	1										
	10.5	1									
	11.0										
	11.5										
	1										
L_	12.0	1									

5 7 L 2580 MEZ

		BI-	ivery hes)		PID	OVA	
Log	Elev. (feet)	Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
	12.5						
	13.0						
	13.5						
	14.0						
	14.5						
	15.0						
	15.5			Boring terminated at 15.0 feet.			
	16.0			•		i	
	16.5					:	!
	17.0						
	17.5						
	18.0						,
	18.5	ĺ					
	19.0						
ŀ	19.5					1	
	20.0						
	20.5					:	
	21.0						
	21.5						
	22.0						
	22.5	į				İ	
	23.0						
	23.5						
	1					:	
	24.0					1	

Boring LC-09; 3 feet south was fill material including garbage to 19.5 feet bgs.

econencation

Andrew Contracts

ecology & environment, inc. DRILLING LOG

Site	. Name:	· Lake	e Calu	met Cluster Site Boring	g Number:		LC-1	1
	ation:	Chic	ago, C	Cook County, Illinois Start I	Date:		4/19/	
TD	D:		-9806		letion Date:		4/19/	99
Dri	lling Fi	rın:	Patric	k Drilling Borin	g Location:	East central (South of U.	part of site	area)
	e of Ri			E-75	-			area)
					nd Elevation:		96.10 feet 98.52 feet	
	ologist				C. Elevation:			
		ig(type			of Boring: _ Number:		20.0 feet n/a	-
		nterval([aterial:		B Hier Bullings 10 Tool	number: ng Method:	Rotary	w/ hollow st	em augers
MIII	iuiai ivi	iaichiah.	_	Grout- Bentonite	-			
				Seal- Bentonite chips				
				Filter Pack- Sand			Depth to G	
Wat	David	opinent	Come	16-41		While drilli	•	8 feet bgs
wei	Deven	оршеш	Com	45% of LEL read on CGI.		at completic		eet (T.O.I.C.) bgs
						after develo	pinent: 4	1.92 feet (T.O.I.C.) bgs
	T	Т	700					
	Elev.	Blow	Recovery (inches)			PID	OVA	
Log	(feet)	Count	22€	Material Description		(ppm)	(ppm)	Remarks
-	0.0	1		Black Organic silty CLAY, roots noted.		0	0	
<u>-</u>	0.5	2					0	4
	-	2						
	1.0	ļ	}					
_	1.5	3		FILL: Gray silty CLAY; trace c-f sand, some m-f gravel.				
-		2	1.0					
<u> </u>	2.0		18					
-	2.5	3						
		7						
	3.0	-						
•	3.5	11				0	0	
1	1						0	
3,	4.0		18	FILL: White Claylike material.				
	4.5	4				0		
	1.1.5	8		(No Recovery)		U	0	
?	5.0							
	5.5	10						
	3.5	12					į	
	6.0	12	0]		
	6.5	56		FILL: Black Debris; m-f gravel, metal shavings, wood chips.		0	0	
	0.5	14						
	7.0	14						
	7.5	4						
	1	1						
	8.0	5	6			0	0	
		4						
İ	8.5							
Ì	9.0	3					!	
i		2						
	9.5	-					ļ	
?	: 10.0	2	0	(No Recovery)				
		3						Large Limestone Rock only
	10.5	_						recovery
	11.0	ı						Tecovery
	İ	1						
	11.5							
	12.0	1	1					

8 0 80 08 B1

and the second sections of

	, ,				T	1	
Log	Elev. (feet)		Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
?	12.5	5					
1	13.0	9			0	0	
	13.5	8		m-f Gray SAND			
	14.0	8	12				
	14.5	_			0	0	
	15.0	1					
	15.5	-					
	16.0	_	18				
	16.5	2		m-f Gray to Black SAND	0	0	
	17.0	•					
	17.5	2					
	18.0	3	10				
	18.5	2			0	0	
	19.0	_		·			
	19.5	,		Gray silty CLAY, trace c-f sand, trace m-f gravel.			
•	20.0	8	14		0	0	
				Boring terminated at 20.0 feet.			
	20.5						
	21.0						
	21.5						
	22.0						
	22.5						
	23.0						
	23.5						
	24.0						
	24.5						

se in adjusted t

ecology & environment, inc. DRILLING LOG

Loc TD Dri Typ Dri Ge We Scr An	cation: D: Illing Finds pe of Ri	Chica S05-	ego, Co 9806-0 Patrick CME- Kevin H Joseph : & qty.) type &	Drilling -75 Hathaway Klemp : 2-inch stainless size) 2-inch stainless / 10 foot Grout Bentonite Seal- Bentonite chips Filter Pack- Sand	Boring Number: Start Date: Completion Date: Boring Location: Ground Elevation: T.O.I.C. Elevation: Depth of Boring: Lock Number: Drilling Method:	East ce (South	4/20/9 4/20/9 4/20/9 4/20/9 4/20/9 4/20/9 4/20/9 4/20/9 4/20/9 96.05 fee 97.74 fee 15.0 feet n/a 4 w/ hollow Depth to 0 ling: 1 tion: 3	9 9 f site um pad area) et
Log	Elev.	Blow Count	Recovery (inches)	Material Description		PID (ppm)	OVA (ppm)	Remarks
	0.0							
	1.0_	1		Blind Drilled to 15.0 feet bgs.				
	1.5			(All cuttings are Brown to Gray silty Clay)				
	2.0							
	2.5	_				777		
	3.0							
	3.5							
	4.0							
	4.5							
	5.0	_					•	
	5.5							
	6.0	-						
	6.5							
	7.0							
	7.5							
	8.0							
	9.0							
	9.5	1						
İ	10.0							
	10.5							
	11.0							
	11.5							
	12.0							

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			20				
Log	Elev. (feet)	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
-	12.5						
	13.0						
	13.5						
	14.0						
	14.5	l					
	15.0						
	15.5			Boring Terminated at 15.0 feet.			,
	į						
	16.0	ļ					
	16.5			,			
	17.0						
	17.5						
	18.0						
	18.5						
	19,0						
	19.5						
	20.0						
	20.5						
	21.0						
	21.5						
	22.0						
	22.5						
	23.0	i					
	23.5						
	24.0		ļ				
	24.0						

Headspace at end of boring is at 20% of LEL as indicated by CGI.

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ecology & environment, inc. DRILLING LOG

Location: Chicago, Cook County, Illinois TDD: S05-9806-008 Drilling Finn: Patrick Drilling Type of Rig: CME-75 Driller/Helper: Kevin Hathaway Geologist Joseph Klemp Well Casing(type & qty.): 2-inch stainless Screened interval(type & size) 2-inch stainless / 10 foot Annular Material: Grout-Seal-Bentonite Seal-Filter Pack-Sand Well Development Comments:				Drilling Dri	Boring Number: Start Date: Completion Date: Boring Location: Ground Elevation: T.O.I.C. Elevation: Depth of Boring: Lock Number: Drilling Method:	4/21/99 4/21/99			
Log	Elev.	Blow Count	Recovery (inches)	Material Description		PID (ppin)	OVA (ppm)	Remarks	
	0.0 0.5 1.0 1.5 2.0 2.5 3.0	1 1 1 7	2	FILL: Black to Brown Debris; Wood, plastic, glass.		0	2	Wet	
	3.5 4.0 4.5 5.0	8 4 3	4			0	0	Wet Piece of rubber noted.	
	5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5	3 6 4 13 11 6 3 3	11			0	2	Mostly paper.	
	10.5 11.0 11.5 12.0	3 7 5	0	(No Recovery)		3			

			(8) E				
Log	Elev. (feet)	Blow Count	Recovery (inches)	Material Description	PID (ppm)	OVA (ppm)	Remarks
7	12.5	3			0	0	
	13.0	1		FILL: Debris; plastic, gravel, glass, wood.			
	13.5	1					
	14.0	1	1				
	14.5	4					
	15.0	3					Glass, wood,
	15.5	1			0	1	fine gravel.
		1	2				
	16.0			Boring terminated at 16.0 feet.			
	16.5	ļ					
	17.0						
	17.5	-					
	18.0						
	18.5						
	19.0						
	19.5						
	20.0						
	20.5						
	21.0						
	21.5	1					
	22.0						
	22.5					i !	
	23.0						
		}					
	23.5						
	24.0	1					
	24.5	5					

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SITE LZKe Col	unet Chastes	<u> </u>	
TDD/PAN 505- 9	306-008 18	NO BO ISEYLY	· · · · · · · · · · · · · · · · · · ·
WELL DRILLING CONTRACTOR	Patrick	Drilling.	
GEOLOGIST	Joseph KV	2 mp	
DATE COMPLETED	4/28/99		
LOCATION OF WELL	North End	of Site	

	DATE INSTALLED 4/22/99
FLEV HEIGHT PROTECTIVE COVER	PROTECTIVE COVER:
Z.75 TOP OF RISER	GROUND ELEVATION (MSL): FT.
ELEV DEPTH SURFACE SEAL	SURFACE SEAL:Concrete
	RISER TYPE: Stainless DIAMETER: 20 IN.
ELEV DEPTH TOP OF	GROUT: Bentonite Crout
SEAL	ANNULAR SEAL: Benton: te Chips
below ground surface	, , , , , , , , , , , , , , , , , , , ,
HEV DEPTH TOP OF	•
ELEV DEPTH SAND	60.5
	FILTER PACK: SAND
5 TOP OF	·
ELEV DEPTH SCREEN	SCREEN DIA.: Z.O IN. LENGTH: 10 FT.
	TYPE: Stainless
	SLOT SZE: 0.01 IN.
	U 2/
15 волом	BOREHOLE DIAMETER: 4,25 IN.
ELEV DEPTH , OF SCREEN	DRILL METHOD: Rotary w/ Hollow
16 or someth	DATE DEVELOPED: 4/29/99
FLEV DEPTH BOTTOM	METHOD OF DEVELOPEMENT: Surge Aum
OF HOLE	METHOD OF DEVELOPEMENT: Surap Aum
MATERIALS USED	
ПЕМ	QUANTITY
well screen	10 64
well Casing	7 84
SAMO	5 begs
Gront	<u> </u>
Bentonte Chips	t bay

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MONITORING WELL AS-BUILT DIAGRAM

SITE LEXE	- Columet	Cluster.		<u></u>		
TDD/PAN 50	5-9806-0	08 18	NOBOLSI	メメ		
WELL DRILLING CONTI						
GEOLOGIST						
DATE COMPLETED		4/281				
LOCATION OF WELL	Northeast	Lornes 0	f site;	South east	lones	of LHL 1.

	date installed 4/23/99
ELEV HEIGHT PROTECTIVE COVER	PROTECTIVE COVER:
2,75 TOP OF RISER	GROUND ELEVATION (MSL): FT.
1,42' BOTTOM OF SURFACE SEAL	SURFACE SEAL: Concrete
ELEV DEPTH SURFACE SEAL	RISER TYPE: Stzinless Steel
	DIAMETER: 2.0 IN.
ELEV DEPTH TOP OF	GROUT:
SEAL SEAL Delow ground surface	ANNULAR SEAL: Be-tonik CL:1/25
ELEV DEPTH SAND	FILTER PACK: SAND
HELEV DEPTH SCREEN	SCREEN DIA.: 2.0 IN. LENGTH: 10 FT. TYPE: Stanless Steel SLOT SIZE: 0.01 IN.
ELEV DEPTH BOTTOM ELEV DEPTH BOTTOM BOTTOM BOTTOM BOTTOM	BOREHOLE DIAMETER: 4.75 IN. DRILL METHOD: Rotzny ~/ Hollow Sten Angus DATE DEVELOPED: 4/29/99 METHOD OF DEVELOPEMENT: Surge / Pump
OF HOLE MATERIALS ITEM	USED
well Screen well Cising Filter Sand	10 Ft 7 Ft bags
Rentante Chips Rentante Gran	\$ 28200 A

WELL NUMBER: _______

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	MONITORING	WELL	AS-BUILT	DIAGRAN
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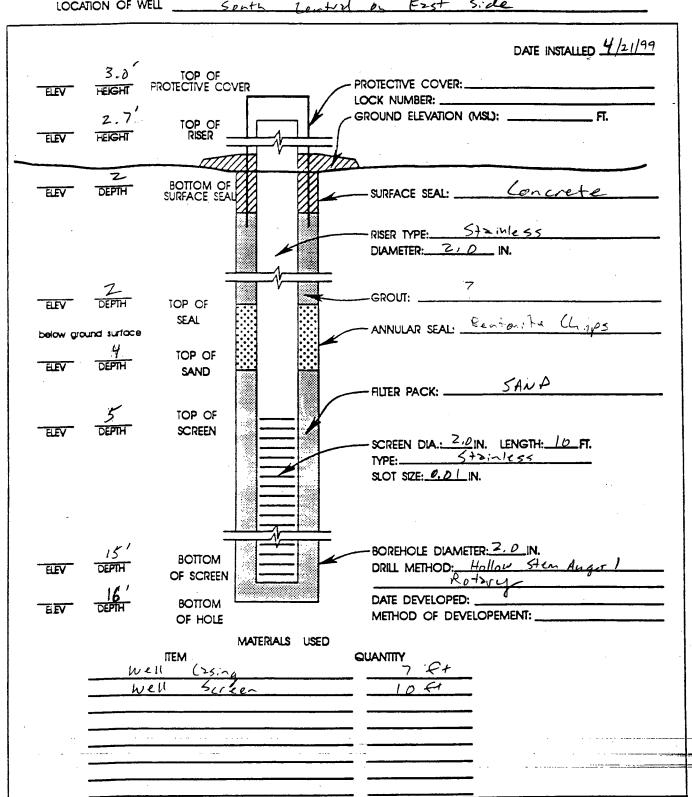
	DATE INSTALLED 4/23/99
3.3' TOP OF FLEV PROTECTIVE COVER	PROTECTIVE COVER:
TOP OF RISER	GROUND ELEVATION (MSL): FT.
	7
ELEV DEPTH BOTTOM OF SURFACE SEAL	- SURFACE SEAL: Concrete
	PISER TYPE: S+ 2: 1255 DIAMETER: Z. D IN.
2.5	,
ELEV DEPTH TOP OF	GROUT:
SEAL SEAL	
below ground surface	ANNULAR SEAL:
<u>4</u> TOP OF	
ELEV DEPTH SAND	
3210	
	FILTER PACK:
4.5 TOP OF	·
ELEV DEPTH SCREEN	2
	TYPE: 3+2 mless
	SLOT SIZE: # .DI IN.
	•
	BOREHOLE DIAMETER: 4.25 IN.
ELEV DEPTH BOTTOM	DRILL METHOD: Ratory W/ Hollow
OF SCREEN	Stem Augus
IS DEPTH BOTTOM	DATE DEVELOPED: 4/29/97
EEV DEPTH BOTTOM OF HOLE	METHOD OF DEVELOPEMENT: Surge / Parme
·	
MATERIALS USED	CLIANTITY
Well Screen	QUANTITY 10 f+
Well Casing	
Cillar (L.)	3 620,5
bentonic Chips	

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MONITORING WELL AS-BUILT DIAGRAM

SITE LZKe Czlu	met Chuster
TDD/PAN 505 - 980	06-008 / BNOBOISTXY
WELL DRILLING CONTRACTOR _	Patrick Dilling
GEOLOGIST	Joseph Klemp
DATE COMPLETED	4/28/99
LOCATION OF WELL	South landed on Fist Side



Hadvorad de N

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нашиолуна рив (фороза MONITORING WELL AS-BUILT DIAGRAM Lake Calumet Christer Sites 505-9806-008 1 BNOBOL STXY TDD/PAN _ Patrick. Drilling WELL DRILLING CONTRACTOR Joseph Klemp GEOLOGIST ____ DATE COMPLETED of Site near RR \$ 122 mst (rossing LOCATION OF WELL

,	DATE INSTALLED 4/26/99
TOP OF FLEV PROTECTIVE COVER	LOCK NUMBER:
* Z.17 TOP OF ELEV HEIGHT RISER	GROUND ELEVATION (MSL): FT.
- 71111	
LEV DEPTH SURFACE SEAL	SURFACE SEAL: Quikreta (conveta)
	RISER TYPE: Stainless DIAMETER: Z.O IN.
I, U TOP OF	GROUT: No~(
SEAL : below ground surface	ANNULAR SEAL: Ventrate Chips
1 , b.	
ELEV DEPTH SAND	
	FILTER PACK:
/ Jon of	
ELEV DEPTH SCREEN	SCREEN DIA.: 20 IN. LENGTH: 10 FT. TYPE: 2-55+ 5+2-1(255 SLOT SIZE: 1.01 IN.
ELEV DEPTH BOTTOM OF SCREEN ELEV DEPTH BOTTOM OF HOLE	BOREHOLE DIAMETER: 425 IN. DRILL METHOD: Potry n/ Hollow Stem Augus DATE DEVELOPED: 4/30/99 METHOD OF DEVELOPEMENT: Swgo / Pump
men sce well sce well sce well sce Eilter sch Bentonite	

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ROVINGO DEGR

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SITE 1 2 Ke Columnt Chapter	<i>F.</i> .
TDD/PAN 505-9866-008 1.	GNOGOI SIXY
WELL DRILLING CONTRACTOR PALICK	Drilling
GEOLOGIST JASEPH KLEMP	
DATE COMPLETED 4/26/99	
LOCATION OF WELL Southeset Central	Port of Site - North of Fence

DATE INSTALLED 4/26/99
2.75 TOP OF PROTECTIVE COVER: LOCK NUMBER:
GROUND ELEVATION (MSL):FT.
ELEV DEPTH BOTTOM OF SURFACE SEAL: Concrete
RISER TYPE: Stanless DIAMETER: Z.O IN.
Z.7.5 GROUT:GROUT:
below ground surface SEAL ANNULAR SEAL: ** Benjanite (Life
4' TOP OF
ELEV DEPTH SAND
PLIER PACK: SAND
TOP OF STATE
SCREEN DIA: 2.0 IN. LENGTH: 10 FT.
TYPE: 5+2,-1455
SLOT SIZE: <u>0.0(</u> IN.
BOTTOM BOREHOLE DIAMETER: 4,25 IN.
ELEV DEPTH OF SCREEN DRILL METHOD: Rothery / Hollow Stem
ELEV DEPTH BOTTOM DATE DEVELOPED:
OF HOLE METHOD OF DEVELOPEMENT:
MATERIALS USED
WELL Cosing QUANTITY
Well Screen 10 St
Bertonte Unips 5 Bay
3-4 Bzy 5

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MONITORING WELL AS-BUILT DIAGRAM

	14101	1110111110	/ **CLL / %	DOIL! D!			
SITE	Lake C	shinet	Chuste	Site			
IDD/PAN	505	- 980	6-008	1 BNO.80	1 SIXY		
WELL DRILLING	CONTRACT	OR .	Patrick	Drilling		· · · · · · · · · · · · · · · · · · ·	
GEOLOGIST _			Klemp				
DATE COMPLE		4/27	199				
LOCATION OF	WEIL A	Chum I-	inerstar	next to	eristing_	nell R-5	

	DATE INSTALLED 4/21/99
ELEV	33" TOP OF PROTECTIVE COVER: LOCK NUMBER:
ELEV	GROUND ELEVATION (MSL):FT.
ELEV	DEPTH BOTTOM OF SURFACE SEAL:
	RISER TYPE: S+ 2,1 L (2 S S DIAMETER: Z.O IN.
E.FV	DEPTH TOP OF SEAL SEAL SEAL SEAL SEAL SEAL SEAL SEAL
pelow gro	und surface ANNULAR SEAL:
ELEV	TOP OF SAND FILTER PACK: SAND
ELEV	TOP OF SCREEN SCREEN DIA.: Z-IN. LENGTH: 10 FT. TYPE:
ELEV	BOTTOM OF SCREEN 14 DEPTH BOTTOM OF HOLE BOTTOM OF HOLE BOTTOM OF HOLE BOTTOM OF HOLE BOTTOM OF HOLE BOTTOM OF DEVELOPED: METHOD OF DEVELOPEMENT:
	MATERIALS USED ITEM QUANTITY Well Screen 10 ft Well Casing 5 ft
	Entonite Grant Rentanite Chips Rentanite Chips
4	

WELL	NUMBER:	LL
WELL	NUMBER:	LC

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MONITORING WELL AS-BUILT DIAGRAM	,	/
STE 12Ke Columet Cluster.	<u></u>	
TDD/PAN 505-9806-008 / 8NOBOL STXY	<i>y</i>	
WELL DRILLING CONTRACTOR Patrick Drilling		
GEOLOGIST Joseph Klemp		
DATE COMPLETED 4/27/96		
LOCATION OF WELL Central Part of Site East	of Albain	MAD
[OCAION O		

,			DATE INSTALLED 4/20/99
ELEV HE	(7 ' GHT PROTE	TOP OF CTIVE COVER	PROTECTIVE COVER:
ELEV HE	,7 <i>9</i> /:	TOP OF RISER	GROUND ELEVATION (MSL): FT.
ELEV DE	PIH SUI	OTTOM OF RFACE SEAL	SURFACE SEAL: Concrete
			RISER TYPE: S+2; ~ less DIAMETER: Z.O IN.
ELEV DI		OP OF	GROUT: Bentonite
below ground		SEAL [:::]	ANNULAR SEAL: <u>Gentonite</u> Chips
		TOP OF SAND	ALTER PACK: SAND
ELEV D	15 EPTH	TOP OF SCREEN	SCREEN DIA: ZIN. LENGTH: 50 FT. TYPE: Stankess SLOT SIZE: 0.01 IN.
· · · · ·	<u>20</u> эертн 2 <u>0</u>	BOTTOM OF SCREEN	BOREHOLE DIAMETER: 4.25 IN. DRILL METHOD: Hollow Stem Anges Rotary (cm E-75) DATE DEVELOPED:
	मॉस उ	OF HOLE	METHOD OF DEVELOPEMENT:
- - -	Well We F:1 Ben	MAJERIA TEM Screa	QUANTITY 5 Ft 17 ft 2 5 2 4 5 2 4 5 2 5 2 5 5 5 5 5 5 5 5 5

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WELL NUMBER: ______

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MONITORING WELL AS-BUILT DIAGRAM

SITE LEKE (Shinet Cluster Site

IDD/PAN SOS - 9806 - 009

WELL DRILLING CONTRACTOR Patrick Drilling.

GEOLOGIST Joseph Klemp

DATE COMPLETED 4/27/99

LOCATION OF WELL Lentral Part of Site West & Albam Incircultor Part

	3.17	TOP OF	DATE INSTALLED 4/20
ELEV	HEIGHT	TOP OF PROTECTIVE COVER	LOCK NUMBER:
	2.75		GROUND ELEVATION (MSL): FI.
ELEV	HEIGHT	TOP OF RISER	-A-11-(
		milk	William .
	2.25	BOTTOM OF	SURFACE SEAL: Concrete
ELEV	DEPTH	BOTTOM OF SURFACE SEAL	SURFACE SEAL:
			RISER TYPE: 5+2, ~ less
			DIAMETER: 2 0 IN.
	2.25		GROUT: hentonite
ELEV	DEPTH	TOP OF	****
	und surface	SEAL	ANNULAR SEAL: Bentonte CL. PS
pelow alo	<i>u</i> 34.000	TOP OF	
ELEV	DEPTH	SAND	
•			FILTER PACK: SAND
	ζ'	TOP OF	
ELEV	DEPTH	SCREEN :	SCREEN DIA .: 2 IN. LENGTH: 10 FT.
			TYPE: 312: 1655
			SLOT SIZE: O.O.L.IN.
			BOREHOLE DIAMETER:IN.
	DEPTH	воттом	DRILL METHOD:
ELEV		OF SCREEN	
ELEV	DEPTH DEPTH	воттом	METHOD OF DEVELOPEMENT: 5,160, PM
D.E.V		OF HOLE	
			TERIALS USED QUANTITY
	W	TEM ell (25:200)	7 Ft
		veu screen	
		Silter Sind	5 bigs
		Bentonte Chip Bentonte S	lwry bigs
	The second of th	3C 7/10/17	

red Followings,

WELL NUMBER: LC-11

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тэшполічая Бин узоюмя MONITORING WELL AS-BUILT DIAGRAM

Lake Columnt Cluster Site 505-9806-008 / BNO 801 SIXX TDD/PAN _ Patrick Prilling WELL DRILLING CONTRACTOR __ GEOLOGIST Joseph Klemp DATE COMPLETED _ Central Part of Site LOCATION OF WELL

LOCAION OF THE	
	DATE INSTALLED _4/19/49
3,17 top of PROTECTIVE COVER	PROTECTIVE COVER:
1.83 TOP OF HEIGHT RISER	GROUND ELEVATION (MSL):FT.
ELEV PERSIN	
ELEV DEPTH SURFACE SEAL	SURFACE SEAL:Concerte
	RISER TYPE: Stanless DIAMETER: 2.0 IN.
II. D ELEV DEPTH TOP OF	GROUT: <u>Es-tonite</u> Since (Enviroping
SEAL SEAL SEAL	ANNULAR SEAL: Bentonite Chips
ELEV DEPTH SAND	
	FILTER PACK: SAND
IU.0' TOP OF SCREEN	SCREEN DIA.: Z IN. LENGTH: 5 FT. TYPE: 5+2.0/e 55
	SLOT SIZE: O. O.L. IN.
19.6 ВОПОМ	BOREHOLE DIAMETER: 425 IN.
ELEV DEPTH OF SCREEN	DRILL METHOD:
ELEV DEPTH BOTTOM OF HOLE	DATE DEVELOPED:
M. TEM	ATERIALS USED QUANTITY
filter sand Benjante Chi	$\frac{6.0 + 1}{1 + 1}$
well screen	5- F4 15- F4
Well Ezking Bentonite SI	18 54

WELL NUMBER:

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MONITORING	WELL	AS-BUILT	DIAGRAM
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SITE Lake Calu	met Cluster	Site.			
TDD/PAN SOS-G	1806-008 / 8	NOBOI SIX	/		
WELL DRILLING CONTRAC		- Drilling			
GEOLOGISI	oseph Klemp				
DATE COMPLETED	4/28/	99		·	
LOCATION OF WELL	E25+	10 mt/21	P2+ 0 f	5:40	

			DATE INSTALLED 4/19/99
ELEV	Z.42 HEIGHT	TOP OF PROTECTIVE COVER	PROTECTIVE COVER:
ELEV	Z.O (1	GROUND ELEVATION (MSL): FT.
			With
ELEV	DEPTH	BOTTOM OF SURFACE SEAL	SURFACE SEAL: Concrete
			RISER TYPE: 5+2: nlc 55 DIAMETER: 2.0 IN.
ELEV	2.0 DEPTH	TOP OF	GROUT: Bentonite
below gro	ouna surface	SEAL	ANNULAR SEAL: BELLOS (Lips
ELEV	OEPTH	TOP OF SAND	FILTER PACK: SAND
ELEV	S. DEPTH	TOP OF SCREEN	SCREEN DIA.: 2,0 IN. LENGTH: 10 FT.
			TYPE: Stanless SLOT SIZE: 2.0 IN.
			BOREHOLE DIAMETER: 4.25 IN.
ELEV	DEPTH	BOTTOM OF SCREEN	DRILL METHOD: Hollow Sten Muser
£.EV	15 DEPTH	BOTTOM OF HOLE	DATE DEVELOPED: METHOD OF DEVELOPEMENT:
			LS USED
			QUANTITY 7 Et
	- v	ell Sister	10 Ft bogs
		tenite Chips	5 2 ps
	<u>De</u> 1	tonite Grant	924/

WELL NUMBER:

пошиолума рин Стором

recycled paper

•		DATE INSTALLED 4/21/99
34 " ELEV HEIGHT	TOP OF PROTECTIVE COVER	PROTECTIVE COVER:
ELEV HEIGHT	TOP OF RISER	GROUND ELEVATION (MSL): FT.
ELEV DEPTH	BOTTOM OF SURFACE SEAL	SURFACE SEAL: Concrete
		PISER TYPE: Stainless DIAMETER: 7.0 IN.
ELEV DEPTH	TOP OF	GROUT:
	SEAL 🔛	ANNULAR SEAL Benjaning (h./.
below ground surface		7 THOUSE
ELEV DEPTH	TOP OF	— HUER PACK: S AND
ELEV DEPTH	TOP OF SCREEN	SCREEN DIA: Z IN. LENGTH: 10 FT. TYPE: STEIN 1055 SLOT SIZE: D.D.1 IN.
ELEV DEPTH	BOTTOM OF SCREEN	BOREHOLE DIAMETER: 4.25 IN. DRILL METHOD: 1+0/10w Sten Huges. Rotary
ELEV DEPTH	BOTTOM OF HOLE	DATE DEVELOPED:
	MATERIALS USED THEM WELL Screen WELL Casing	QUANTITY 10 Ft 7 Ft

Drilling Logs and Well Construction Reports For Existing Groundwater Wells (P01 through P04)

ecclogy and environment, inc. 111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604

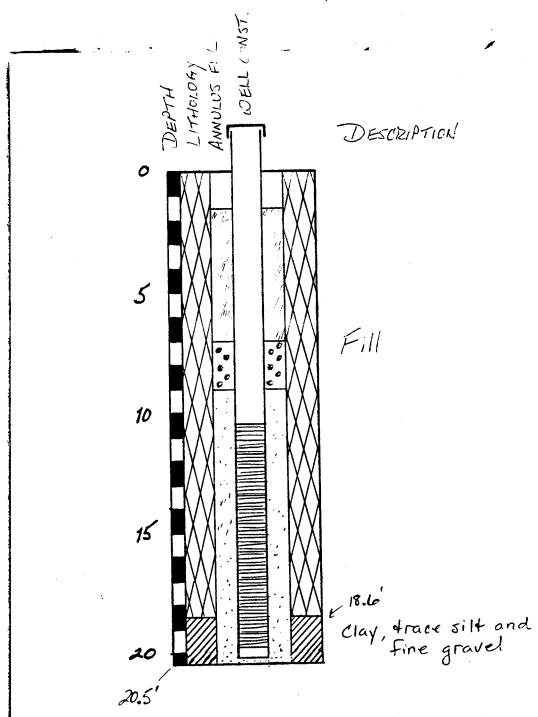
	A 11	. م. ن . م	tor		Drilling Firm Fox Drilling Inc.		
me .	Alburn -	-neine	rac ici		Type of Orill , Mobile BHOF		
n .	Chicago, IP8020				Oriller/Helper Barry Urban / Bernie Crack	7	
)	110000			•	Geologist		
	. P	1 .		Ground E	levation Depth to Groundwater	\$	Date
ring Num		-2 - 9	0		Elevation while drilling		
art Date		2-9		Depth of	Boring at completion	(TOIC)	
ring Loc	eation North,	ost Corr	ar ,+5	te Lock Num	ber after days	(TOIC)	
				071111119	Methods Hollow Stem Augers 33/4 ID		
11 Casin	ng (Type & Qty	.)	2" Sc	h. 40	PVC		
reen Int	erval (Type &	Qty.) _	10'	sch 40 ft	L 1051.t		
nulus M	aterial Above	Seal: _	Volc	ay Grove			
				enite Pell	473		
		_	41110	a Sand			
	lopment Commen		<u> </u>)			1
350	Begin brillia	ig Lei	rei e	3		Above	
1925	Finish &	Level.	<u>B</u>				READINES Borellole
				Hydrostrati-		00 : 1 55 = 51	Remarks
Sampl	e Sample Depth		1 .	graphic Unit			reathing Zone
Numbe	r From - To	Count	(in.)	From - To			
1-4-	3.50			Blind B	ill 0-3 Grand Sorface Gray Gra	<u> </u>	and the
	1	1575					
	3-5	75	8	FILL	Black Gravel Cinder Paper Same	BH A	Dot Pecoistad
		-	1 1		Med Sand Saturated		O PAD BE
1		3.					> 1000
102	8-10	3894	2	FILL	Wood, Brick, Black, Saturated		1. O
1-2						8Z, 1 SS	(* '
1		ļ			Wood Stock in luse of S.S -		200
		122	2	FILL	Black Coarse to the sand some red	82	20
03	13-15	4	 			55	0
				9	brick fragments. Satirated	┿	
		4258	7,1	7"	As Above	59	0
04	18-20	28	14	/	43 H 10016	BZ	2.00p 4
				711	Light Gray Clay Trace Silt Trace		
	<u> </u>	 		- 			•
1				·	small Grave Moist		
-					11 = 5- 10 slot Screen	, k	
Au	7 to 20	5	Bug	in to se-	+ well ripe - 2-5 10 slot Screen	' \ -	
			2	-10° m	ers Sand Filter Pack 20.5' +	79	· · · · · · · · · · · · · · · · · · ·
		1	Whi	(P Dulling	· augere incrementally, Bentonite Pellets	9,	to 7'
			1-1.	612	1 1 to 55 while removing av	ders	
		1	1	7,20,00	ntointo blockage in augers. Valelay growt	32	一位
			16-	remedy be	whom shockage in avyers. The little of the		
			L	ground s	proceed enter		
		THE PARTY OF THE P					

2.2	p of Inside Casing		
6	round Surface	concrete	•
5 7	op of Grout		
7.0_	op .f seal	_ +	
1.0_	op of Filter Pack		
2.4	Top of Screen Interval		
	Bottom of screen Interval		_
20.3	Bottom of well (with plug)		
20.5_	END OF BORING		
			_
	ne part Brill Turk	्राज्य _{वि} ं अस्ति । सन्ति	Control of the Contro
	•		

ect	ect Name > Alburn Incinerator Boring Well No. > F I Borehole BZ = Brenthing zone 55 = Split spoon								
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov.	Description	Remarks				
; ; ; ; ;	SURFACE 3.0-5.0	, N/A ,1-5-7-5	, , , , ,	; Gray gravel ; Fill consisting of black ; gravel, cinders, paper, some ; medium sand, saturated	OVA background 2-6 ppm BH - N/A BZ - background SS - 10ppm				
; ;552 ;	38.0-10.0 33.0-10.0	3-8-9-4 ,3-8-9-4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Fill consisting of wood, brick, saturated (wood stuck in tip of 55)	;BH - > 1,000 ppm ;BZ - background ;55 - Oppm				
, , , , ,	313.0 - 15.0	; ; ; ; ; ; ; ; ; ; ;	, 2 , , , , , , , , , , , , , , , , , ,	Fill consisting of black, ;medium to coarse sand, ;some red brick fragments, ;saturated	BH 200 ppm BZ - 20 ppm 355 - 0 ppm				
224	;18.0 - 20.0	;4-2-5-8 ; ; ; ; ; ;	3.14	Finches: same as above 7 inches: Light gray clay, trace silt, drace fine gravel moist	BH - 10 ppm BZ - background SS - 0 ppm				
)))))))))))))))))))	20.5	, N/A)))))))))))))))))))	END OF BORING)))))))))))))))))))				
> > > > >)))))))))	> > > >))))))))				

recycled paper

ecology and environment.



bottom of well 20.3'
bottom of screen 19.8' top of screen 10.4'

cop of filter pack 9.0'

top of seal 7.0'

top of grout 1.5'

0-1.5' concrete

ta nyaksa is

ecology and environment, inc. 111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604

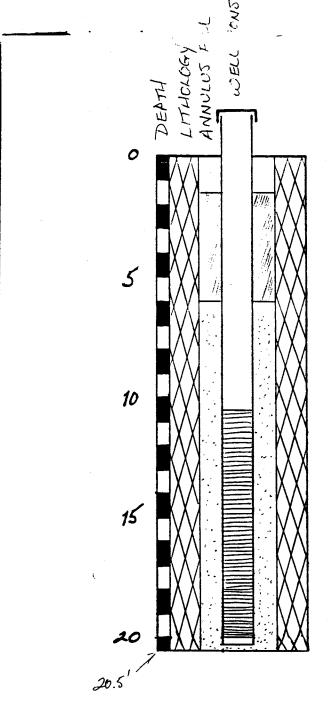
		•	1		Drilling Firm	Fox D	filling Inc		
	Alburn I	ncinero	tor						
ion _	hicago, I	<u> </u>			Oriller/Helper	BARRY	/ BERNIE		
	IP8020				Geologist	TP.			
									Date
	יי ת	`		Ground E	levation		epth to Ground	vater	Date
ığ Mümbi	er P	2 500			Elevation		while drilling	(701/	-
; Date		3 -		Depth of			at completion	(7010	
letion	Date <u>10-</u>	3 - 90	2.Cove	J lock Num	ber		after days	(101)	<u>- 1</u>
ig Loca	tion ~115°	7 V 1. V	- Core	Drilling	Methods Hollow	tem Aug	*rs		_
	Not East fe	1 7	" 50	h. 40	PVC				
Casing	(Type & Qty.	0+ y)	10/5	ch 40 PV	c 1051.t				
en Inte	rval (lype &	443.1	<u> </u>						
lus Mat	erial Above S	eal:							
		creen: _							
_	_							11/110	y conditting
Deve 10	pment Comment	in D	1162	my her	el B	V		W	('t
L'	/ ·)' '		7	-			BKE	3 OFA
								Z-	3 OFA 3 20 FRM Remarks
1			1	Hydrostrati-	Descri	iption of M	aterial		Remarks'
Sample	Sample Depth	Blow	Rec.	graphic Unit From - To		· 			
	From - To			1100 - 15	/		.1	in Ha	an rel
200	und 5.	, las	ح ا	weeks	Brown/Black	< 10 PSG	1 MIXE	The state of the s	4.0.
1214	Uno .						**************************************	. 1	
							14	3	2 8 ppm
		5-8	.0	Fill	Rlack and Ro	שומנים	1 Gray C	lax B	7 0
31	3-5	77	18	rit	Black and Br	000	24	bE	3H 8
					occasional	cull cr	9, small	graver	
					1 .				
					Moist			B	H>1000
	ļ	Q.	2	~	ai i c.	1.	5	1 -	
02	8-10	83710	8	7166	Black Clay	124 13	PAUL		BON-14
Pa	10				Plastic, W	() (161275) [.5	54
1					11/25/12/00	POPI		\$ e	· · · · · · · · · · · · · · · · · · ·
		1.			Saturated				
l	<u>.</u>	<u> </u>				naybe wi		210	
	1.2/1.	i da	+ L	الا لامامه	in some thin	9, PV	(plug-	015	
V 1	to roge	1/2 7E		1	, 11	1.	ladion 1	7 C	2-16
	10/11/3	Hring	125	avgers	FOR OVA	in open	1 NOIE	20% R	~
	11-1-2	T		1		ŧ	•		
-	1+0 13	1	 	 	-				
	1			1		•			
		100		 		. 01		c - 1	3H 207AM
03	12 11	99/25	18	Fill	Dark Gray Y	oblac	E Clay	10000	53 4
03	1/3-15		1	1	10 11		(1)	in theates!	، مراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المراد المرا
				1	Cardboard	wood,	+ IDers	- In	34120
		101	11	1	1 /	,		į,	25122
TE T	10-40	1 24	11	17111	477 11 DONC		A .		•
 		200	1	100 L	Jell. Bott	em of	Augier a	re !	
10	thel do	70.5		JYTI			1 A A	السندير	•
-1	ŧ			hula	ger w some	thing.	Maybe &	0000	\(\frac{1}{\sqrt{1}}\)
1				4	1 7	4		<u>`</u>	**, **********************************

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T) I	
г	\rightarrow	
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pre Sample De ber From - To		Blow Count	Rec. (in.)	Hydrostrati- graphic Unit From - To	Description of Material	Remarks
DET TON TO				- .	pull well scrent riser.	
					but plug in augers pound of	
					hanner on rig	
					V	
		- 8-9		210	Return frage (unch-drillers	
	_				continue to pound out obstructi	~
				770	to no avail.	· · ·
	$\frac{1}{2}$		· ·	720	Dilloro full the entire structure of angery. A steel cable al	
					18 wrapped my around. He lead as	
					Dismantle Arypis comme call	
					Hole grayed open placel-w	4
					in hole sand-in hole by	
~					boring to 6 -698.	1
				3:00	Bugin Mixing Groot	
					Volclay grout to 9.5. from 6	
	_				No pilets were used	
	_				*	
	+					
-						
	_					
	_					·
·						at the granter go
		, et se	22.50			Page of

i				
,		Red		
	top of Inside Casing	• - -		
	Ground Surface			
	Ground Surface			
	Concrete-	>		
ا ب	- + c +		•	
!-2	Top of Grout			
Ì				
	•			
1				
		-+-		
				-
20_	Top of Filter Pack	-		
7.5	Top of Screen Interval			
L	1			
			••	
	Top of the	🗐 - 📙	. <u> </u>	
0.0_	Bottom of screen Interval			_
	Bottom of well (with plug)			
	. 3	į		
105		A the participant of the second of the secon		
2.2 -	END OF BORING			
	÷.			
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	eg de selbre de de d		Contact the Land	Carlo di
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Project Project	None > AIDUF Number > ED 8	n Inc	inera	Bul = Bacabala	3114 21966V
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	. Description	Remarks
; ; ; ; ; ;	;5URFACE ;3.0-5.0	; N/A ; ; ; ; ; ; ; ; ; ; ;	, 18	Brown / black topsoil mixed with gravel, vegetation Fill consisting of black and brownish gray clay, occasional cinders, fine gravel, moist	;BH - 8 ppm ;BZ - backgrour
3552	38.0-10.0 38.0-10.0	\$ -3-7-10	> > \	; Fill consisting of black; clayer gravel, some plastic, wood, cinders, saturated	BH - > 1,000 ppn 50 ppm methyle chloride BZ - backgrour SS - 4 ppm
553	3.0-K.0	349-1-2-5 , , , ,	318	Fill consisting of dark gray to black clay, some cardboard, wood, fibers, saturated.	1, 8H - 20 DAM
554	318-0-20.0	> > >	> > >	Fill as above	; BH - 120 ppm ; BZ - backgrou ; SS - 100 ppm
>	20.5	>	>	END OF BORING	
)))))))	and auge	again	iat. Find	me tangled up in something 20'. Drillers pulled ent a 1" diameter steel cable	17 20 OT



DESCRIPTION

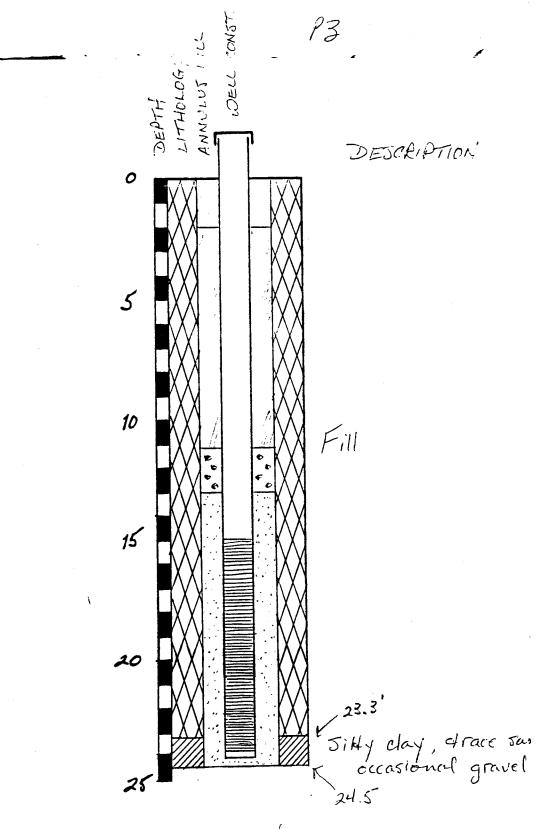
F.11

bottom of well 20.3' bottom of screen 20.0' dop of screen 10.5 top of filter pack 1000 60 Seal? top of growt 1.5 0-1.5 concrete

● e	Alburn 3	Enciner	ator		Drilling Firm Fox Drilling Inc.							
A - 10	Chicago,	IL_			Type of Orill							
	IP8020				Driller/Helper Barry Uthan/Bernie Cra	chy						
•	<u></u>		_		Geologist <u>TD</u>							
	_	_			Durak An Consumburation	Date						
ជាមេ ដែលដ	ber P	<u> 3` </u>			levation Depth to Groundwater	Date						
irt Date		- 4 - 9	0		Elevation water of triang	TOIC)						
pletion	Date 10-	. 4 - 9	0	_	bor my	TOIC)						
ing Loc	ation <u>130</u>	5		Lock Num	mer	1010)/ and						
				Orilling	Methods Hollow Stem Augers 38/4"ID							
11 Casin	g (Type & Qty	.)2	<u>. 5</u>	h. 40	PVC	\$4°						
een Inte	erval (Type &	Qty.) _	10'	sch 40 ft	c 1051.t							
iulus Ma	terial Above :											
		Seal:										
		Screen: _										
11 Devel	opment Commen	ts:				866 2 2						
	•			_		BKG 2-3 lec peaks 20						
Buci	re Drilling	y Levi	el B	@ 10:3	50 11:40 Avgo: to 2215							
12-7				Hydrostrati-	· · · · · · · · · · · · · · · · · · ·	Romanks						
Sample	Sample Depth	Blow		graphic Unit	Description of Material	Remarks						
	From - To	Count		From - To		BH 8						
			اما	- 16 I	III Brown Sandy Granelly Topsois	- (-						
600	Val Svr	tacre -	VU	6603 1	III Drown sandy Cruzy							
	2 =	23.	0	۱ ۱ ما	ecovery							
	3-5 :	20		i i	•							
102	8-10	8 3 H B	14	while or	Miner to 8 Black stained rage are							
		-			rought to the surface on the augus	B# 5"						
	 				Some Some	55 Z						
	<u> </u>			FILL	Gray and Black Clay Wood, Paper							
					Plastic Glass Moist	× 20						
		22 11			Scity 1							
03	13-15	2345	10	LIC	Brownish Gray Clay Frace Sin grovel	BH 200 ME						
				·	trace line to med sand Moist	ס> יץ 						
		4697		_	(1/4	Z1 7 A :						
104	18-20.	1 7	10	FILL	The second second	BH 20						
					wood, some gravel saturated	55 2						
-	120 -	4569	15	3"	, and the state of							
05	23-25	109	1:2	5	Fill AS ABOVE							
				12"	Grayiste Brown Filty Clay trace fine	st 10						
		ļ			to med sand occ small grame wet.	55 2						
	0	1	20	1								
A	puce the	prs +	b 2°	2 bg)	place well in augeis sand in							
	VELPAC DO	r =	14.55	1/ inch	Language to the state of the st	-						
7	19. 1.	1	L.J									
1		TSCYCSO.	1		consequent entre	New York						
.1	1	ı	1	i	∮ magazina	3						

+	
.	Free P
Top of Inside Casing	
Ground Surface	
10m d. 2.	
100 _ Top of Grout	Concrete
10p of Grout	
11.2_ Top of Seal	
13 Top of Filter Pack	
4.9 Top of Screen Interval	·
Top of Can In	
3.9_ Bottom of screen Interval	
4_3 Bottom of well (with plug)	
4.5 _ END OF BORING	
1	
	, and the second
•	
* ·	
1	· ·

roject	roject Nem > Alburn Incinerator project Number > IP8020 BH = Borehole BZ = Breathing zone 55 = 5plit spoon												
Sample No.	Sample Depth From - To (ft)	Blow Count	Remarks										
> > >	SURFACE	;N/A	> >	Brown, sundy, gravelly dopsoil, vegetation	; OVA background ; 2-3 ppm								
551	3.0-5.0	; ;2-2-3-3	?0	No recovery)))								
3552	38.0 - 10.0	> > > > > > > > > > > > > > > > > > >	314	; Fill consisting of gray ; and black clay, some wood, ; paper, plastic, glass, rags; moist	BH - Sppm BZ - bacleground								
	313-0-15.0	2-3-4-5 , , , ,	3 10	Fill consisting of brownish gray, sitty clay, trace ; fine gravel, trace fine to ; medium sand, moist	;BH - 200 ppm ;BZ - backgrown ;55 - 4 ppm								
1354	;18.0-20.0	> '4-6-9-7 > > > > >	310	Fill consisting of dark gray to black silty day, some wood, some gravel, saturated	BH - 20 ppm ; BZ - backgrour ; 55 - 2 ppm								
3555	323.0-25.0	34-5-6-9 3 3 3 3 3 3 3 3 3 3	315	3 inches: same as above 12 inches: Grayish brown silty clay, trace fine to medium sand, occasional fine gravel, wet	BH- 10 ppm BZ- backgroun SS- 2ppm								
> > > > > >	24.5	NJA)))))	END OF BORING (FINAL AUGER ADVANCE))))))								



bettern of well 24.3'
bettern of screen 23.9' top of screen 14.5
top of fitter pack 13.0'
top of seal 11.2'
that of around 2.0' 0-2.0' concrete

mojeraci s

ecology and environment, inc. 111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604

N	Alburn -	Tucine	rator		Drilling.Fir	Tox Drilling.	Lnc.		
Name –	Chicago	<u> </u>			Type of Dril				
. -	Chicago, IP8020	<u></u>			Driller/Help	er		يم د. د	
-	11000				Geologist				
	• -	,						. 1	Data
ក្នុ ស្រីជា	ber P	4			Elevation	Depth to Gr			Date
t Date		-5 -9			. Elevation	while drill		(TOIC)	174.00
letion	Date 10-	- 5 - 9	0_		f Boring	at completi		(TOIC)	
ng Lcc	ation ~/OC	noF	<u> </u>	Lock Nu	mber		22/3 1	(1000)	
	east of,				g Methods <u>Hallow</u>	Diem Augus			
Casin	g (Type & Qty	'-) <i>a</i>	101			_			
			10	364 40 PV					
ilus ma	terial Above	Seal:							
	-	Screen:							
Devel	opment Commen	-				* ** ** ** ** ** ** ** ** ** ** ** ** *	·		
	O		3			WIND WIND	그	ろれく	35
æ.	٠ - ي - ۱۱۰	. <i>c</i> š	**** 0	الم ام ما الأ					
Deg	ice Drills	my ve		Hydrostratt				OV	A
- 1	Sample Depth	i .	•	graphic Unit	Desc	ription of Material	The state of the s	ر 130 م	Resarks
	From - To	Count	(in.)	From - To	A.		494	82	2-5
		,		-1-7	a 1 1)	110 4. Tre from	-	62	,
610	Ura) 301		-	805 HOO G	ravel No			53	BKG
	3-5	3766	16	FILL	Black 6	rune (Dood, Pa	per	ВH_	rx3
	3-2	-6	1			`	· (
		_			6/asg, 51	TVLATEDYCLEC	K WATER	-	
	0 15	2345	1	F	• `			SS	7
02	8-10	345	<u></u>	FILL	1117 ANG	Clay avil Grant	1, 234	31	200.
	İ				lilary Some	Paper Saturated	1 w/ Black	<u> </u>	· · · · · · · · · · · · · · · · · · ·
		 						िट	J. Proc.
			<u> </u>		water				
		6879	14		BANK EINS	well sorted &	20 10 d	55	3NB
03	13-15	079	117			100 11 7011 Car 15	ano	BH	>1000
					Satirated			52	BRG
			-						CLEBH
			ļ						<u> </u>
. ,		34	121	10 K	Ac Ab	introdec)			50
24	13-20	391111	127		MY HOAVE.	IL IVER CEC		135	BKB
				140	Gravish B	rown and Born	العرادان		
			l		Drange Ver	, gilty Clay h	<u>) </u>	 	<u> </u>
	11 1	_ , <		5' '	~ .	L L			
Die	11 6 2	0.5	 	Jet Wel	(08.70)	Augers out of h	olow 110	1	
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				120 Ho	6. 19 9000	20 015 to 200	infield e	1	
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i	t	Jest 240'48"	1	1	 		ndege sekerakan Lista	. Barrio 14.	
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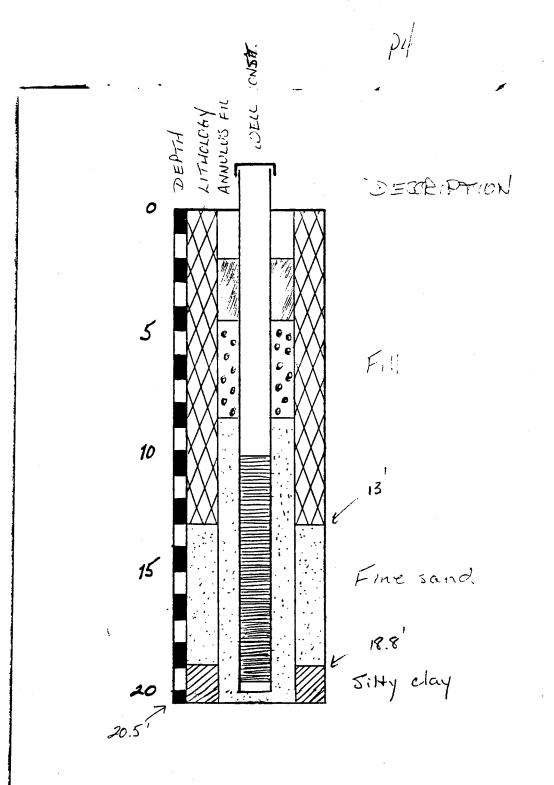
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		(FOR)						
Top of Inside Casing		- - 						
Ground Surface								
1 Groom Sortice								
·	-	Cone	rete					
2' Top of Grout		Garage .						
10p 11 diss								
			-					
	-							
·	•							
.b Top of Seal								
·								
6 Top of Filter Pack_				1				
2 Top of Screen Into	19val	<u>-</u>						
		· 🗐 📗	· · · · · · · · · · · · · · · · · · ·					
		-						
.6_ Bottom of screen in								
2.0 _ Bottom of well (with	, 102							
0.5 _ END OF BORING								
5.5 - EN 11 OF DOKING	1							
			. Commente de la constantina de la compansión de la compa					
T								

an he With

e e e geografia (Antwern 1911)

roject Froject	roject Name > Alburn Incinerator Boring Well No. > 14 BH = Borehole AZ = Breathing Zong 55 = Jplit space												
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov.	BZ = Breathing zone 33-07	Remarks								
> > >	SURFACE	; N/A	> > >	: Crushed gravel	; OVA background ; 3-5 ppm								
351	3.0-5.0	3-7-6-6 , , , , ,	; (g	Fill consisting of black gravel, wood, paper, glass, sadurated	BH - Oppm BZ - backgrown 35- Oppm								
, , , , ,	;8.0-10.0 ;) 2-3-4-5))	 	Fill consisting of gray silty clay and gravel, some wood, paper, saturated	; βH - 200 ppm ; BZ - backgroun ; 55 - 7 ppm								
553	; 13-0-15.0			Gray, Fine, well-sorted; sand, saturated	BH - > 1,000 pp BZ - backgrour 355 - 0 ppm								
;555.4	;18.0-20.0 ;	3-9-11-11 > > > > > >	24	10 inches: same as above inches: grayish-brown and brownish-orange very silty clay, wet									
	20.5	; N/A))))))))	END OF BORING)))))))))))))))))))								

 $\bigcirc .1$



bettom et well 20.0'

bettom et screen 19.6' top et screen 10

top et Filter pack 8.6'

top et seal 4.6'

top et growt 2.0'

0-2.0' concrete.

:



Appendix D

Historical Site Analytical Data from Previous Reports



SUMMARY OF SEDIMENT SAMPLES METAL RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	Sed ^a Background (ppm)	FoE Sed Background	Ontario ^b LEL (ppm)	FoE Ontario LEL	Ontario SEL (ppm)	FoE Ontario SEL	NOAA ^c ERL (ppm)	FoE NOAA ERL	NOAA ERM (ppm)	FoE NOAA ERM	RCRA ^d EDQL (ppm)	FoE RCRA EDQL
Aluminum	20/20	6,340.000	9,663.000	15,600.000	2,600	20/20		NP	NP	NP	NP	NP	NP	NP	NP	NP
Antimony	3/20	4.800	7.767	12.400	0.16	3/20		NP	NP	NP	NP	NP	NP	NP	NP	NP
Arsenic	26/27	4.900	17.015	104.000	1.10	26/27	6	24/27	33	3/27	8.2	15/27	70	2/27	5.9	
Barium	27/27	42.400	156.822	582.000	0.70	27/27	NP	NP	NP	NP	NP	NP	NP	NP		
Beryllium	8/20	0.050	0.481	0.800	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP		
Cadmium	24/27	0.200	2.813	8.900	0.30	23/27	0.06	24/27	10	0/27	1.2	18/27	9.6	0/27	0.596	
Calcium	20/20	47,200.000	73,450.000	106,000.000	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP		NP
Chromium	27/27	20.000	96.737	537.000	13	27/27	26	26/27	110	6/27	81	6/27	370	1/27	26	
Cobalt	20/20	9.800	12.255	15.000	10	18/20	NP	NP	NP		NP	NP	NP	NP		
Copper	20/20	25.400	59.505	91.800	25	20/20	16	20/20	110			19/20	270	0/20		
Iron	20/20	18,100.000	28,015.000	40,900.000	18,000	20/20	20,000	19/20	40,000	1/20		NP	NP	NP		
Lead	27/27	23.500	184.374	725.000	17	27/27	31	26/27	250		46.7	26/27	218	5/27		
Magnesium	20/20	10,200.000	17,030.000	23,800.000	400	20/20		NP				NP		NP		
Manganese	20/20	419.000	915.850	· · · · · · · · · · · · · · · · · · ·		20/20			 	 		NP		NP	 	
Mercury	13/27	0.098	0.369	0.900	0.05	13/27			2		0.15	12/27	0.71	2/27	0.174	
Nickel	20/20	24.300	35.385	49.400		20/20			 			20/20				
Potassium	20/20	1,870.000			 	NP	 				ļ	NP				
Selenium	10/27	1.200	2.570	4.200	0.29	10/27		 			 	NP				
Silver	9/27	0.170	1.051	2.700	<u> </u>	6/27	NP				1	2/27				
Sodium	18/20	131.000	1,495.333	3,940.000												
Thallium	1/20	1.800	1.800	1.800	NP							NP				
Vanadium	20/20	20.600	31.130	48.900				1		 			ļ			
Zinc	20/20	85.600	613.280	1,200.000	38	20/20	120	19/20	820	5/20	150	18/20	1 410	13/20	111	1

Table D-7 continued

Key:

Sed Sediment. LEL Lowest effect level. SEL Severe effect level. == National Oceanographic and Atmospheric Administration. NOAA = **ERL** Effects range low. = **ERM** Effects range medium. == FoE Frequency of exceedence. Information not provided or calculated. NP = Parts per million. ppm

Sources:

NOAA Screening Quick Reference Tables (SQRT) freshwater sediment background levels (metals only) (1998).

Guidelines for the protection and Management of Aquatic Sediment Quality in Ontario (1993).

^c = Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments (1995).

U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source:

Datachem Laboratories, Inc., Salt Lake City, Utah.

Table D-8

SUMMARY OF SEDIMENT SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

	Frequency of	Minimum Detection	Average Detection	Maximum Detection	Ontario ^a LEL	FoE Ontario	Ontario SEL	FoE Ontario	NOAA ^b ERL	FoE	NOAA ERM	FoE	RCRA ^c	FoE RCRA
Chemical	Detection	(ppm)	(ppm)	(ppm)	(ppm)	LEL	(ppm)	SEL	(ppm)	NOAA ERL	(ppm)	NOAA ERM	EDQL (ppm)	EDQL
VOCs									 	Win				
1,1-Dichloroethane	1/27	0.002	0.002	0.002	NP	NP	NP	NP	NP	NP	NP	NP	0.001	1/27
2-Butanone	8/27	0.006	0.082	0.210	NP	NP	NP	NP	NP	NP	NP	NP	0.14	2/27
Acetone	23/27	0.007	0.312	1.200	NP	NP	NP	NP	NP	NP	NP	NP	0.45	4/27
Benzene	4/27	0.002	0.021	0.052	NP	NP	NP	NP	NP	NP	NP	NP	0.14	0/27
Carbon disulfide	2/27	0.024	0.027	0.030	NP	NP	NP	NP	NP	NP	NP	NP	0.13	0/27
Ethylbenzene	1/27	0.006	0.006	0.006	NP	NP	NP	NP	NP	NP	NP	NP	0.0001	1/27
Methylene chloride	3/27	0.012	0.043	0.066	NP	NP	NP	NP	NP	NP	NP	NP	1.26	0/27
Toluene	4/27	0.002	0.005	0.009	NP	NP	NP	NP		NP		NP	52.5	0/27
Xylenes	3/27	0.002	0.010	0.018	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
SVOCs														
1,2-Dichlorobenzene	2/27	0.093	0.116	0.140	NP	NP	NP	NP		NP		NP	0.23	0/27
2,4-Dimethylphenol	3/27	0.079	0.470	1.200	NP	NP	NP	NP		NP		NP	0.30	1/27
2-Methylnaphthalene	13/27	0.083	0.541	2.600	NP	NP	NP	NP		13/27	0.67	2/27	0.02	13/27
2-Methylphenol	3/27	0.120	0.293	0.520	NP	NP	NP	NP		NP		NP	0.001	3/27
4-Chloroaniline	2/27	0.380	2.740	5.100	NP	NP	NP	NP		NP		NP	0.15	2/27
4-Methylphenol	7/27	0.081	0.234	0.640	NP	NP	NP	NP		NP		NP	NP	NP
4-Nitroaniline	1/27	0.220	0.220		NP	NP	NP	NP		NP		NP	0.0002	1/27
Acenaphthene	8/27	0.066	0.276	1.300	NP	NP	NP	NP		8/27	0.5	1/27	0.01	8/27
Acenaphthylene	9/27	0.190	0.540	1.400	NP	NP	NP	NP		9/27	0.6	3/27	0.01	9/27
Anthracene	23/27	0.080	0.273	0.940	0.22	10/27	370	0/27	0.09	21/27	1.1	0/27	0.05	23/27
Benzo[a]anthracene	26/27	0.190	0.557	1.300	0.32	22/27	1,480	0/27	0.3	23/27	1.6		0.03	26/27
Benzo[a]pyrene	26/27	0.160	0.611	1.500	0.37	20/27	1,440	0/27		18/27	1.6	0/27	0.03	26/27
Benzo[b]fluoranthene	26/27	0.260	0.905	2.500			NP	NP		NP		NP	10.4	0/27
Benzo[g,h,i]perylene	22/27	0.110	0.360	0.740	0.17	20/27	320		NP	NP		NP	0.2	20/27
Benzo[k]fluoranthene	25/27	0.088	0.482	1.400	0.24	18/27	1,340			NP			0.2	18/27
Benzoic acid	7/7	0.210	0.836	2.700			NP						NP	NP
Benzyl alcohol	2/7	0.210	0.230	0.250	NP		NP							2/7 13/27
Bis(2-ethylhexyl)phthalate	16/27	0.090	1.921	8.400	NP	NP	NP	NP	NP	NP	NP	NP	0.2	13/2/

SUMMARY OF SEDIMENT SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

						7100, 101								
Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	Ontario ^a LEL (ppm)	FoE Ontario LEL	Ontario SEL (ppm)	FoE Ontario SEL	NOAA ^b ERL (ppm)	FoE NOAA ERL	NOAA ERM (ppm)	FoE NOAA ERM	RCRA ^c EDQL (ppm)	FoE RCRA EDQL
Butylbenzylphthalate	8/27			4.300	NP	NP	NP	NP	NP	NP	NP	NP	4.2	1/27
Carbazole	3/20	ļ	0.101	0.170	NP	NP	NP	NP	· NP	NP	NP	NP	NP	NP
Chrysene	26/27		0.688		0.34	22/27	460	0/27	0.4	21/27	2.8	0/27	0.06	26/27
Di-n-butylphthalate	15/27	0.054	0.272	1.200	NP	NP	NP	NP	NP	NP	NP	NP	0.1	12/27
Di-n-octylphthalate	4/27			0.280	NP	NP	NP	NP	NP	NP	NP	NP	40.60	0/27
Dibenz[a,h]anthracene	16/27		0.159	0.280	0.06	16/27	130	0/27	0.06	16/27	0.26		0.01	16/27
Dibenzofuran	14/27	0.042	0.130	0.460	NP	NP	NP	NP	NP	NP	NP	NP	1.5	0/27
Fluoranthene	25/27	0.270	1.278	3.200	0.75	17/27	1,020	0/27	0.6	21/27	5.1	0/27	0.1	25/27
Fluorene	19/27	0.078	0.246	1.400	0.19	7/27	160		0.02	19/27	0.54	2/27	0.02	19/27
Indeno[1,2,3-cd]pyrene	25/27	0.096	0.303	0.630	0.2	21/27	320		NP		NP	NP	0.2	21/27
Isophorone	7/27	0.059	2.727	11.000	NP	NP						NP	0.4	5/27
Naphthalene	21/27	0.076	0.384	1.900	NP	NP	NP		0.2	14/27	2.1	0/27	0.03	21/27
Pentachlorophenol	3/27	0.330	1.743	3.100	NP	NP	NP		NP	NP		NP	30.1	0/27
Phenanthrene	25/27	0.250	0.711	1.700	0.56		950		0.24		1.5	2/27	0.04	25/27
Phenol	4/27	0.110	0.417	0.810		·					NP	NP	0.03	4/27
Pyrene	24/27	0.330	0.887	2.000	0.49	19/27	850	0/27	0.7	17/27	2.6	0/27	0.05	24/27
PCBs/Pesticides	- L						<u>,</u>				, 	1		270
Aroclor 1242	7/27	0.093	0.288	1.000	NP							L	NP	NP
Aroclor 1254	13/27	0.091	0.200	0.440	0.06		34						NP	NP NP
Aroclor 1260	7/27	0.070	0.101	0.180			24					NP	NP	
4,4'-DDD	23/27	0.008	0.064	0.329									0.01	23/27 20/27
4,4'-DDE	20/27	0.003	0.025	0.074	NP					20/27	0.03		0.001	6/27
4,4'-DDT	6/27	0.010	0.044	0.144			1							6/27
Aldrin	6/27	0.009	0.015	0.024										2/27
alpha-BHC	2/27	7 0.009	0.011	0.014										NP
alpha-Chlordane	6/27	7 0.008	0.034	0.110										
delta-BHC	10/27	7 0.003	0.017	0.039										11/27
Dieldrin	11/27	7 0.003	0.021	0.064										1/27
Endosulfan I	1/2	7 0.042	0.042	0.042	NF NF	NP	NP	NI NI	NP	NP	I NP	I NP	0,0002	L

SUMMARY OF SEDIMENT SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	Ontario ^a LEL (ppm)	FoE Ontario LEL	Ontario SEL (ppm)	FoE Ontario SEL	NOAA ^b ERL (ppm)	FoE NOAA ERL	NOAA ERM (ppm)	FoE NOAA ERM	RCRA ^c EDQL (ppm)	FoE RCRA EDQL
Endosulfan II	1/27	0.298	0.298	0.298	NP	NP	NP	NP	NP	NP	NP	NP	0.000104	1/27
Endosulfan sulfate	2/27	0.025	0.031	0.037	NP	NP	NP	NP	NP	NP	NP	NP	0.03	
Endrin	1/27	0.025	0.025	0.025	0.003	1/27	130	0/27	NP	NP	NP	NP	0.003	1/27
gamma-Chlordane	9/27	0.002	0.010	0.054	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Heptachlor epoxide	2/27		0.005	0.007	0.005	1/27	5	0/27	NP	NP	NP	NP	0.0006	2/27

Key:

LEL	=	Lowest effect level.
SEL	==	Severe effect level.
NOAA	-	National Oceanographic and Atmospheric Administration.
ERL	===	Effects range low.
ERM	=	Effects range medium.
FoE	=	Frequency of exceedence.
NP	=	Information not provided or calculated.
ppm	=	Parts per million.
VOCs	. =	Volatile organic compounds.
S VOCs	=	Semivolatile organic compounds.
PCBs	=	Polychlorinated biphenyls.

Sources:

^a = Guidelines for the protection and Management of Aquatic Sediment Quality in Ontario (1993).

b = Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments (1995).

^c = U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source:

Southwest Laboratory of Oklahoma, Broken Arrow, Oklahoma.

SUMMARY OF SURFACE WATER SAMPLES METAL RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	USEPA ^a CCC (ppm)	FoE USEPA CCC	USEPA ^b CMC (ppm)	FoE USEPA CMC	OSWER ^c EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^d EDQL (ppm)	FoE RCRA EDQL
Aluminum, Dissolved	2/4	0.105	0.163	0.222	NP	NP	NP	NP	NP	NP	NP	NP
Aluminum, Total	20/25	0.051	0.226	0.702	NP	NP	NP	NP	NP	NP	NP	NP
Antimony, Total	3/25	0.004	0.005	0.005	NP	NP	NP	NP	NP	NP	0.03	0/25
Arsenic, Dissolved	3/4	0.008	0.018	0.033	0.15	0/4	0.34	0/4	NP	NP	0.05	0/4
Arsenic, Total	9/25	0.005	0.015	0.045	0.15	0/25	0.34	0/25	NP	NP	0.05	0/25
Barium, Dissolved	4/4	0.036	0.148	0.285	NP	NP	NP	NP	0.004	4/4	5	0/4
Barium, Total	25/25	0.049	0.108	0.358	NP	NP	NP	NP	0.004	25/25	5	0/25
Beryllium, Dissolved	1/4	0.0004	0.0004	0.0004	NP	NP	NP	NP	0.01	0/4	0.01	0/4
Cadmium, Total	3/25	0.001	0.001	0.001	0.002	0/25	0.004	0/25	0.001	1/25	0.001	3/25
Calcium, Dissolved	4/4	86.000	111.500	134.000	NP	NP	NP	NP	NP	NP	NP	NP
Calcium, Total	25/25	34.700	75.072	140.000	NP	NP	NP	NP	NP	NP	NP	NP
Chromium, Dissolved	2/4	0.006	0.007	0.008	NP	NP	NP	NP	, NP	NP	0.04	0/4
Chromium, Total	7/25	0.001	0.026	0.073	NP	NP	NP	NP	NP	NP	0.04	2/25
Cobalt, Total	2/25	0.017	0.017	0.017	NP	NP	NP	NP	0.003	2/25	0.005	2/25
Copper, Dissolved	4/4	0.005	0.008	0.012	0.009	. 1/4	0.01	0/4	0.01	1/4	0.005	3/4
Copper, Total	6/25	0.004	0.010	0.033	0.009	1/25	0.01	1/25	0.01	1/25	0.005	3/25
Iron, Dissolved	4/4	0.054	0.195	0.523	1	0/4	NP	NP		0/4	NP	NP
Iron, Total	25/25	0.084	0.909	6.580	1	7/25	NP	NP		7/25	NP	NP
Lead, Total	7/25	0.003	0.022	0.107	0.002	7/25	0.06	1/25	0.002	7/25	0.001	7/25
Magnesium, Dissolved	4/4	34.700	56.000	75.800	NP	NP	NP	NP		NP	NP	NP
Magnesium, Total	25/25	35.300	52.004	73.900	NP	NP	NP	NP	NP	NP	NP	NP
Manganese, Dissolved	4/4	0.098	0.908	2.460	NP	NP	NP	NP	0.08	4/4	NP	NP
Manganese, Total	25/25	0.032	0.508	2.790	NP	NP	NP				NP	NP
Mercury, Total	1/13	0.0001	0.0001	0.0001	7.7E-07	1/13	1.4E-06	1/13	1.3E-06	1/13	1.3E-09	1/13
Nickel, Dissolved	1/4	0.030	0.030	0.030	0.05	0/4	0.47	0/4			0.03	1/4
Nickel, Total	17/25	0.003	0.013	0.076	0.05	2/25	0.47	0/25			0.03	2/25
Potassium, Dissolved	4/4		45.250	81.900	NP	NP	NP	NP				NP
Potassium, Total	25/25		46.504	412.000	NP	NP	NP	NP	NP	NP	NP	NP

SUMMARY OF SURFACE WATER SAMPLES METAL RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

	, — — — — — — — — — — — — — — — — — — —											
Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	USEPA ^a CCC (ppm)	FoE USEPA CCC	USEPA ^b CMC (ppm)	FoE USEPA CMC	OSWER ^c EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^d EDQL (ppm)	FoE RCRA EDQL
Selenium, Dissolved	2/4	0.002	0.002	0.002	0.005	0/4	NP	NP	0.005	0/4	0.005	0/4
Selenium, Total	2/25	0.002	0.003	0.005	0.005	0/25	NP	NP	0.005	0/25	0.005	0/25
Silver, Total	1/25	0.003	0.003	0.003	NP	NP	0.003	0/25	NP	NP	0.001	1/25
Sodium, Dissolved	4/4	17.300	111.850	221.000	NP	NP	NP	NP	NP	NP	NP	NP
Sodium, Total	25/25	11.900	106.948	208.000	NP	NP	NP	NP	NP	NP	NP	NP
Thallium, Total	1/25	0.002	0.002	0.002	NP	NP	NP	NP	NP	NP	0.001	1/25
Vanadium, Total	3/25	0.016	0.019	0.021	NP	NP	NP	NP	0.02	2/25	0.02	2/25
Zinc, Total	25/25	0.004	0.018	0.093	0.12	0/25	0.12	0/25	0.1	0/25	0.06	1/25

Key:

USEPA = U.S. Environmental Protection Agency.

FoE = Frequency of exceedence.

NP = Information not provided or calculated.

ppm = Parts per million.

Sources:

^a = Criterion continuous concentration (December 1998).

b = Criterion maximum concentration (December 1998).

^c = U.S. EPA Office of Solid Waste and Emergency Response ecological and toxicological thresholds (January 1996).

d = U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source:

Ecology & Environment, Inc. Analytical Service, Lancaster, New York.

SUMMARY OF SURFACE WATER SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

	Frequency	Minimum	Average	Maximum	2	FoE	USEPA ^b	FoE	OSWER ^c	FoE	RCRA ^d	FoE
	of	Detection	Detection	Detection	USEPA	USEPA	CMC	USEPA	EcoTox	OSWER	EDQL	RCRA
Chemical	Detection	(ppm)	(ppm)	(ppm)	CCC (ppm)	CCC	(ppm)	CMC	(ppm)	ЕсоТох	(ppm)	EDQL
VOCs						, ,			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
1,1,1-Trichloroethane	1/25	0.064	0.064	0.064	NP	NP	NP	NP	0.06	1/25	0.09	0/25
1,1-Dichloroethane	1/25	0.036	0.036	0.036	NP	NP	NP	NP	0.05	0/25	0.05	0/25
1,2-Dichloroethane	1/25	0.039	0.039	0.039	NP	NP	NP	NP	NP	NP	0.19	0/25
1,2-Dichloroethene, total	1/25	0.100	0.100	0.100	NP	NP	NP	NP	NP	NP	NP	NP
2-Butanone	2/25	0.002	0.431	0.860	NP	NP	NP	NP	NP	NP	7.10	0/25
4-Methyl-2-pentanone	2/25	0.012	0.246	0.480	NP	NP	NP	NP	NP	NP	3.68	0/25
Acetone	12/25	0.004	0.055	0.520	NP	NP	NP	NP	NP	NP	78	0/25
Benzene	1/25	0.017	0.017	0.017	NP	NP	NP	NP	0.05	0/25	0.11	0/25
Chlorobenzene	4/25	0.001	0.007	0.022	NP	NP	NP	NP	0.13	0/25	0.01	1/25
Chloroform	1/25	0.010	0.010	0.010		NP	NP	NP	NP	NP	0.08	0/25
Ethylbenzene	1/25	0.210	0.210	0.210		NP	NP	NP	0.29	0/25	0.02	1/25
Methylene chloride	19/25	0.001	0.013	0.150		NP	NP	NP	NP	NP	0.43	0/25
Tetrachloroethene	1/25	0.016	0.016	0.016		NP	NP	NP	0.12	0/25	0.01	1/25
Toluene	5/25	0.001	0.112	0.550		NP	NP	NP		1/25	0.25	1/25 1/25
Trichloroethene	1/25	0.180	0.180	0.180	NP	NP	NP	NP		0/25	0.08	1/25
Xylenes	6/25	0.001	0.075	0.440	NP	NP	NP	NP	NP	NP	0.12	1/23
SVOCs					·				NA.	NTD	NP	NP
4-Methylphenol	1/25		0.038	0.038	NP	NP	NP	NP		NP		0/25
Bis(2-chloroethyl)ether	2/25		0.364	0.700		NP	NP	NP		NP	1.14	0/25
Butylbenzylphthalate	2/25		0.001	0.001	NP	NP	NP	NP		0/25	0.05	0/25
Di-n-butylphthalate	4/25		0.001	0.001	NP	NP		NP		0/25 NP	0.003	0/25
Dimethylphthalate	1/25		0.007	0.007		NP					0.900	0/25
Isophorone	1/25	0.220	0.220	0,220	1	NP		NP		0/25	0.900	0/25
Naphthalene	1/25	0.007	0.007	0.007	NP	NP					0.100	0/25
Phenol	1/25	0.005	0.005	0.005	NP	NP	NP	NP	NP	I NP	0.100	0/23
PCBs/Pesticides			<u> </u>	·	1		1 200	I NID	NP	NP	1.1E-06	2/25
4,4'-DDD	2/25		0.00002	0.00003		NP		 			4.96E-12	2/25
4,4'-DDE	2/25		0.00001	0.00001		NP				0/25	9.52E-07	2/25
4,4'-DDT	2/25		0.000003	0.000004				0/25 NP			9.52E-07	NP
alpha-Chlordane	2/25	0.000004	0.0001	0.0002	NP	NP	NP NP	I NP	INI	1		L.,

SUMMARY OF SURFACE WATER SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	USEPA ^a CCC (ppm)	FoE USEPA CCC	USEPA ^b CMC (ppm)	FoE USEPA CMC	OSWER ^c EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^d EDQL (ppm)	FoE RCRA EDQL
delta-BHC	4/25	0.000004	0.00002	0.0001	NP	NP	NP	NP	NP	NP	0.67	0/25
Dieldrin	2/25	0.000003	0.000004	0.000004	5.6E-05	0/25	0.0002	0/25	6.2E-05	0/25	2.6E-08	2/25
Endosulfan I	1/25	0.00001	0.00001	0.00001	5.6E-05	0/25	0.0002	0/25	5.1E-05	0/25	3E-06	
Endosulfan sulfate	2/25	0.00003	0.00003	0.00003	NP	NP	NP	NP	6.1E-05	0/25	0.002	0/25
Endrin	3/25	0.000002	0.00001	0.00002	3.6E-05	0/25	8.6E-05	0/25	NP	NP	2E-06	2/25
Endrin aldehyde	2/25	0.00003	0.0001	0.0001	NP	NP	NP	NP	NP	NP	0.0002	0/25
gamma-BHC (Lindane)	1/25	0.000004	0.000004	0.000004	NP	NP	0.001	0/25	8E-05	0/25	1E-05	0/25
gamma-Chlordane	1/25	0.0001	0.0001	0.0001	NP	NP	NP	NP	NP	NP	NP	NP
Heptachlor	3/25	0.00001	0.0001	0.0003	3.8E-06	3/25	0.001	0/25	6.9E-06	3/25	3.9E-07	3/25
Methoxychlor	1/25	0.00002	0.00002	0.00002	3E-05	0/25	NP	NP	1.9E-05	0/25	5E-06	1/25

Key:

USEPA = U.S. Environmental Protection Agency.

FoE = Frequency of exceedence.

NP = Information not provided or calculated.

ppm = Parts per million.

VOCs = Volatile organic compounds. SVOCs = Semivolatile organic compounds.

PCBs = Polychlorinated biphenyls.

Source:

^a = Criterion continuous concentration (December 1998).

b = Criterion maximum concentration (December 1998).

U.S. EPA Office of Solid Waste and Emergency Response ecological and toxicological thresholds (January 1996).

d = U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source:

Ecology & Environment, Inc. Analytical Service, Lancaster, New York.

SUMMARY OF GROUNDWATER SAMPLES METAL RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	MCL ^a (ppm)	FoE MCL	SMCL ^b (ppm)	FoE SMCL	R3 Tap ^c Water (ppm)	FoE R3 Tap Water	OSWER ^d EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^e EDQL (ppm)	FoE RCRA EDQL
Aluminum, Dissolved	4/18	0.053	0.166	0.401	NP	NP	0.2	1/18	37	0/18	NP	NP	NP	NP
Aluminum, Total	19/21	0.285	19.119	50.500	NP	NP	0.2	19/21	37	4/21	NP	NP	NP	NP
Antimony, Total	3/21	0.007	0.077	0.160	0.006	3/21	NP	NP	0.01	2/21	NP	NP	0.03	2/21
Arsenic, Dissolved	9/18	0.003	0.008	0.018	0.05	0/18	NP	NP	4.5E-05	9/18	NP	NP	0.05	0/18
Arsenic, Total	16/21	0.006	0.033	0.122	0.05	3/21	NP	NP	4.5E-05	16/21	NP	NP	0.05	2/21
Barium, Dissolved	18/18	0.109	0.532	3.220	2	1/18	NP	NP	2.6	1/18	0.004	18/18	5	0/18
Barium, Total	21/21	0.235	1.162	4.650	2	4/21	NP	NP	2.6	2/21	0.004	21/21	5	0/21
Beryllium, Dissolved	1/18	0.001	0.001	0.001	0.004	0/18	NP	NP	0.07	0/18	0.01	0/18	0.01	0/18
Beryllium, Total	13/21	0.001	0.002	0.006	0.004	2/21	NP	NP	0.07	0/21	0.01	. 1/21	0.01	0/21
Cadmium, Dissolved	2/18	0.006	0.007	0.009	0.005	2/18	NP	NP	0.02	0/18	0.001	2/18	0.001	2/18
Cadmium, Total	10/21	0.004	0.026	0.148	0.005	9/21	NP	NP	0.02	4/21	0.001	10/21	0.001	10/21
Calcium, Dissolved	18/18	14.700	174.872	850.000	NP	NP.	NP	NP	NP	NP	NP	NP	NP	NP
Calcium, Total	21/21	104.000	254.143	788.000	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Chromium, Dissolved	10/18	0.006	0.018	0.070	NP	NP	NP	NP	NP	NP	NP	NP	0.04	1/18
Chromium, Total	20/21	0.003	0.136	0.352	NP	NP	NP	NP	NP	NP	NP	NP	0.04	15/21
Cobalt, Dissolved	3/18	0.024	0.042	0.077	NP	NP	NP	NP	NP	NP	0.003	3/18	0.005	3/18
Cobalt, Total	11/21	0.014	0.036	0.077	NP	NP	NP	NP	NP	NP	0.003	11/21	0.005	11/21
Copper, Dissolved	10/18	0.004	0.007	0.015	NP	NP		0/18	1.5		0.01	2/18	0.005	5/18
Copper, Total	18/21	0.004	0.299	1.170	NP	NP		1/21	1.5	0/21	0.01	15/21	0.005	17/21
Iron, Dissolved	18/18	0.101	83.155	1,420.000	NP	NP		14/18	11	2/18	1	9/18	NP	NP NP
Iron, Total	21/21	1.610	135.879	1,370.000	NP	NP		21/21	11	17/21	1	21/21	NP	
Lead, Dissolved	4/18	0.003	0.009	0.020	NP			NP	NP	NP	0.002	4/18	0.001	4/18
Lead, Total	20/21	0.002	0.807	3.110	NP			NP	NP	NP	0.002	19/21	0.001	20/21 NP
Magnesium, Dissolved	18/18	43.000	123.278	456.000	NP	NP		NP	NP		NP	NP	NP	NP NP
Magnesium, Total	21/21	50.300	141.333	429.000	NP			NP	NP		NP	NP	NP	NP
Manganese, Dissolved	18/18	0.066	1.143	13.700	NP	NP		18/18	0.73	3/18	0.08	16/18	NP NP	NP
Manganese, Total	21/21	0.173	2.210	12.700	NP	NP		21/21	0.73	14/21	0.08	21/21	1.3E-09	11/19
Mercury, Total	11/19	0.000	0.002	0.009	0.002	3/19		NP	0.01	0/19	1.3E-06		0.03	7/18
Nickel, Dissolved	8/18	0.028	0.298	2.020	0.14			NP	0.73	<u> </u>		· · · · · · · · · · · · · · · · · · ·	0.03	17/21
Nickel, Total	19/21	0.010	0.188	1.860	0.14		NP	NP			0.16		NP	NP
Potassium, Dissolved	18/18	26.200	146.739	392.000	NP	NP	NP	NP	NP	NP	NP	J NP	NF	1 174

SUMMARY OF GROUNDWATER SAMPLES METAL RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

					Chi	CAGO,	ILLINO	10						
Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	MCL ^a (ppm)	FoE MCL	SMCL ^b (ppm)	FoE SMCL	R3 Tap ^c Water (ppm)	FoE R3 Tap Water	OSWER ^d EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^e EDQL (ppm)	FoE RCRA EDQL
Potassium, Total	21/21	37.600	156.748	378.000	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Selenium, Dissolved	15/18	0.002	0.004	0.008	0.05	0/18	NP	NP	0.18	0/18	0.005	3/18		3/18
Selenium, Total	16/21	0.003	0.009	0.023	0.05	0/21	NP	NP	0.18	0/21	0.005	12/21	0.005	12/21
Silver, Dissolved	1/18		0.018	0.018	NP	NP	0.1	0/18	0.18	0/18	NP	NP	0.001	1/18
Silver, Total	10/21	0.005	0.012	0.021	NP	NP	0.1	0/21	0.18	0/21	NP	NP	0.001	10/21
Sodium, Dissolved	18/18	121.000	709.611	2,640.000	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Sodium, Total	21/21		678.333	2,760.000	NP	NP	NP	NP	NP	NP	NP	NP	NP	
Thallium, Dissolved	3/18		0.017	0.045	0.002	3/18	NP	NP	0.003	3/18	NP	NP	0.001	3/18
Thallium, Total	2/21		0.009	0.016	0.002	2/21	NP	NP	0.003	1/21	NP	NP	0.001	2/21
Vanadium, Dissolved	10/18		0.017	0.078	NP	NP	NP	NP	0.26	0/18	0.019	2/18		
Vanadium, Total	19/21	·	0.069	0.254	NP	NP	NP	NP	0.26	0/21	0.019	15/21	0.02	
Zinc, Dissolved	5/18	 	10.340	51.600	NP	NP	5	1/18	11	1/18	0.1	1/18		
Zinc, Total	20/21	0.018				NP	5	4/21	11	1/21	0.1	16/21	0.06	16/21

Key:

USEPA = U.S. Environmental Protection Agency.

FoE = Frequency of exceedence.

NP = Information not provided or calculated.

ppm = Parts per million.

Sources:

^a = U.S. EPA Office of Water Maximum contaminant level.

b = U.S. EPA Office of Water secondary maximum contaminant level.

c = U.S. EPA Region 3 risk-based concentration for tap water.

^d = U.S. EPA Office of Solid Waste and Emergency Response ecological and toxicological thresholds (January 1996).

e = U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source: Datachem Laboratories, Inc., Salt Lake City, Utah.

Table D-12

SUMMARY OF GROUNDWATER SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

					CHIC	AGO, II	TIMOIS							
_	Frequency of	Minimum Detection	Average Detection	Maximum Detection	MCL ^a	FoE	SMCL ^b	FoE	R3 Tap ^c Water	FoE R3 Tap	OSWER ^d EcoTox	FoE OSWER	RCRA ^e EDQL	FoE RCRA
Chemical	Detection	(ppm)	(ppm)	(ppm)	(ppm)	MCL	(ppm)	SMCL	(ppm)	Water	(ppm)	EcoTox	(ppm)	EDQL
VOCs														
1,1-Dichloroethane	2/21	0.002	0.701	1.400	NP	NP	NP	NP	NP	NP	0.05	1/21	0.05	1/21
1,2-Dichloroethene, total	2/21	0.003	0.377	0.750	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
2-Butanone	1/21	3.600	3.600	3.600	NP		NP	NP	1.9	1/21	NP	NP	7.1	0/21
4-Methyl-2-pentanone	2/21	0.310	0.350	0.390	NP		NP	NP	NP	NP	NP	NP	3.68	0/21
Acetone	7/21	0.019	0.735	5.000	NP		NP	NP	NP	NP	NP	NP	78	0/21
Benzene	19/21	0.001	0.158	2.400	0.005	18/21	NP	NP	0.0004	19/21	0.05	8/21	0.11	1/21
Chlorobenzene	12/21	0.001	0.024	0.170	0.1	1/21	NP	NP	0.11	1/21	0.13	1/21	0.01	3/21
Chloroethane	4/21	0.008	0.058	0.190	NP	NP	NP	NP	0.004	4/21	0.23	0/21	NP	NP
Ethylbenzene	10/21	0.001	0.671	5.800	0.7	1/21	NP	NP	1.3	1/21	0.29	2/21	0.02	4/21
Methylene chloride	8/21	0.001	2.778	22.000	0.005	5/21	NP	NP	0.004	5/21	NP	NP	0.43	1/21
Styrene	1/21	0.002	0.002	0.002	0.1	0/21	NP	NP	1.6	0/21	NP	NP	0.06	0/21
Tetrachloroethene	1/21	0.130	0.130	0.130	0.005	1/21	NP	NP	0.00	1/21	0.12	1/21	0.01	1/21
Toluene	11/21	0.001	3.940	38.000	1	3/21	NP	NP	0.75	3/21	0.13	3/21	0.25	3/21
Trichloroethene	1/21	0.270	0.270	0.270	0.005	1/21	NP	NP	0.002	1/21	0.35	0/21	0.08	1/21
Vinyl chloride	1/21	0.084	0.084	0.084	0.002	1/21	NP	NP	1.9E-05	1/21	NP	NP	0.0002	1/21
Xylenes	13/21	0.001	1.740	18.000	10	1/21	NP	NP	12	1/21	NP	NP	0.12	4/21
SVOCs						,							r	
1,2-Dichlorobenzene	8/21	0.001	0.004	0.011	0.6		NP	NP	0.06	0/21	0.01	0/21	0.01	0/21
1,4-Dichlorobenzene	11/21	0.001	0.002	0.006	0.08	0/21	NP	NP	0.0005	11/21	0.01	0/21	0.04	0/21
2,4-Dichlorophenol	1/21	0.007	0.007	0.007	NP	NP	NP	NP	0.11	0/21	NP	NP	0.02	0/21
2,4-Dimethylphenol	5/21	0.003	0.090	0.320	NP		NP	NP	NP	NP	NP	NP	0.10	1/21
2-Methylnaphthalene	9/21	0.001	0.015	0.070	NP	L	NP	NP	NP	NP	NP	NP	0.33	0/21
2-Methylphenol	5/21	0.001	0.088	0.370	NP		NP	NP	NP	NP	NP	NP	NP	NF
2-Nitrophenol	1/21	0.011	0.011	0.011	NP		NP	NP	NP	NP	NP	NP		0/21
4-Methylphenol	9/21	0.001	0.379	3.000	NP		NP	NP	NP	NP	NP	NP	NP	NF
Acenaphthene	8/21	0.001	0.003	0.010	NP		NP	NP	0.37	0/21	0.02	0/21	0.01	1/21
Acenaphthylene	2/21	0.001	0.001	0.001	NP		NP	NP	NP	NP	NP	NP	1	0/21
Anthracene	9/21	0.001	0.002	0.007	NP		NP		1.8	0/21	NP	NP		9/21
Benzo[a]anthracene	8/21	0.001	0.003	0.008	NP				9.2E-05	8/21	NP	NP	0.001	7/21
Benzo[a]pyrene	8/21	0.001	0.003	0.008	0.0002	8/21	NP		9.2E-06	8/21	1.4E-05	8/21		8/21 1/21
Benzo[b]fluoranthene	7/21	0.002	0.003	0.010	NP	NP	NP	NP	9.2E-05	7/21	NP	NP	0.01	1/21

SUMMARY OF GROUNDWATER SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

	Francis	Minimum	Averege	Maximum		AGO, II			R3 Tap ^c	FoE R3	OSWER ^d	FoE	RCRA ^e	FoE
	Frequency of	Detection	Average Detection	Detection	MCL ^a	FoE	SMCL ^b	FoE	Water	тов кэ Тар	EcoTox	OSWER	EDQL	RCRA
Chemical	Detection	(ppm)	(ppm)	(ppm)	(ppm)	MCL	(ppm)	SMCL	(ppm)	Water	(ppm)	EcoTox	(ppm)	EDQL
Benzo[g,h,i]perylene	5/21	0.001	0.001	0.002	NP	NP	NP	NP	NP	NP	NP	NP	0.01	0/21
Benzo[k]fluoranthene	7/21	0.001	0.003	0,009	NP	NP	NP	NP	0.001	7/21	NP	NP	5.6E-06	7/21
Bis(2-chloroethyl)ether	2/21	0.023	0.141	0.260	NP	NP	NP	NP	NP	NP	NP	NP	1.14	0/21
Bis(2-ethylhexyl)phthalat	2/21	0.042	0.060	0.079	0.006	2/21	NP		0.005	2/21	0.03	2/21	0.002	2/21
Butylbenzylphthalate	3/21	0.001	0.009	0.015	NP	NP	NP		7.3	0/21	0.02	0/21	0.05	0/21
Carbazole	8/21	0.001	0.003	0.009	NP		NP		NP	NP	NP	NP	NP	NP
Chrysene	8/21	0.001	0.003	0.008	NP		NP		0.01	0/21	NP	NP	3.3E-05	8/21
Di-n-butylphthalate	14/21	0.001	0.002	0.014	NP		NP		3.7	0/21	0.03	0/21	0.003	1/21
Di-n-octylphthalate	3/21	0.001	0.001	0.003	NP		NP	NP	NP	NP	NP	NP	0.03	0/21
Dibenz[a,h]anthracene	1/21	0.001	0.001	0.001	NP		NP	NP	NP	NP	NP	NP	1.6E-06	1/21
Dibenzofuran	6/21	0.001	0.003	0.008	NP		NP	NP	NP	NP	0.02	0/21	0.02	0/21
Diethylphthalate	14/21	0.001	0.019	0.230	NP		NP	NP	29	0/21	0.22	1/21	0.003	4/21
Fluoranthene	11/21	0.001	0.006	0.021	NP		NP	NP	NP	NP	0.01	3/21	0.01	3/21
Fluorene	8/21	0.001	0.004	0.012	NP	NP	NP	NP	NP	NP	0.004	2/21	0.004	2/21
Indeno[1,2,3-cd]pyrene	7/21	0.001	0.001	0.002	NP	NP	NP	NP	9.2E-05	7/21	NP	NP	0.004	0/21
Isophorone	2/21	0.001	0.060	0.120	NP	NP	NP	NP	0.071	1/21	NP	NP	0.9	0/21
N-Nitrosodiphenylamine	7/21	0.001	0.002	0.006	NP	NP	NP	NP	NP	NP	NP	NP	0.013	0/21
Naphthalene	13/21	0.001	0.047	0.420	NP		NP	NP	0.01	6/21	0.02	4/21	0.04	2/21
Phenanthrene	11/21	0.001	0.008	0.028	NP		NP	NP	NP	NP	0.01	4/21	0.002	8/21
Phenol	3/21	0.012	1.113	3.300	NP		NP	NP	22	0/21	NP	NP	0.1	1/21
Pyrene	10/21	0.001	0.006	0.019	NP	NP	NP	NP	0.18	0/21	NP	NP	0.0003	10/21
PCBs/Pesticides											,			
4,4'-DDD	4/21	0.0001	0.0001	0.0001	NP					NP		NP		4/21
4,4'-DDE	5/21	0.00003	0.0001	0.0001	NP			L		NP		NP	1	5/21
4,4'-DDT	2/21	0.00003	0.00004	0.00005	NP	<u> </u>				NP		2/21	9.5E-07	2/21
Aldrin	2/21	0.00003	0.0001	0.0002	NP		I		3.9E-06	2/21	NP	NP		2/21
alpha-BHC	2/21	0.00004	0.00004	0.00004	- NP					NP		NP		0/21 NP
alpha-Chlordane	3/21	0.00004	0.0001	0.0001	NP		NP			NP		NP		0/21
beta-BHC	3/21	0.0001	0.0002	0.0003	NP				NP	NP		NP		0/21
delta-BHC	8/21	0.00002	0.0001	0.0002	NP				NP	NP		NP		4/21
Dieldrin	4/21	0.00003	0.0001	0.0001	NP					4/21	6.2E-05	1/21	2.6E-08	3/21
Endosulfan I	3/21	0.00005	0.0001	0.0001	NP	NP	NP	NP	NP	NP	5.1E-05	1/21	3E-06	3/21

SUMMARY OF GROUNDWATER SAMPLES ORGANIC RESULTS FREQUENCY OF DETECTION AND FREQUENCY OF EXCEEDENCE OF ECOLOGICAL THRESHOLDS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

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Chemical	Frequency of Detection	Minimum Detection (ppm)	Average Detection (ppm)	Maximum Detection (ppm)	MCL ^a (ppm)	FoE MCL	SMCL ^b (ppm)	FoE SMCL	R3 Tap ^c Water (ppm)	FoE R3 Tap Water	OSWER ^d EcoTox (ppm)	FoE OSWER EcoTox	RCRA ^e EDQL (ppm)	FoE RCRA EDQL
Endosulfan II	4/21	0.00002	0.00004	0.0001	NP	NP	NP	NP	NP	NP	5.1E-05	1/21	3E-06	4/21
Endosulfan sulfate	2/21	0.00003	0.00003	0.00004	NP	NP	NP	NP	NP	NP	6.1E-05	0/21	0.002	0/21
Endrin	4/21	0.00003	0.00004	0.00005	0.002	0/21	NP	NP	0.01	0/21	NP	NP	2E-06	4/21
Endrin aldehyde	2/21	0.00001	0.0001	0.0001	NP	NP	NP	NP	NP	NP	NP	NP	0.0002	0/21
gamma-BHC (Lindane)	1/21	0.00003	0.00003	0.00003	0.0002	0/21	NP	NP	5.2E-05	0/21	8E-05	0/21	1E-05	1/21
gamma-Chlordane	3/21	0.00003	0.0001	0.0001	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Heptachlor	4/21	0.00002	0.0001	0.0001	0.0004	0/21	NP	NP	1.5E-05	4/21	6.9E-06	4/21	3.9E-07	4/21
Heptachlor epoxide	3/21	0.00002	0.00005	0.0001	0.0002	0/21	NP	NP	7.4E-06	3/21	NP	NP	4.8E-07	3/21

Key:

USEPA = U.S. Environmental Protection Agency.

FoE = Frequency of exceedence.

NP = Information not provided or calculated.

ppm = Parts per million.

VOCs = Volatile organic compounds.

SVOCs = Semivolatile organic compounds.

PCBs = Polychlorinated biphenyls.

Sources:

U.S. EPA Office of Water Maximum contaminant level.

b = U.S. EPA Office of Water secondary maximum contaminant level.

^c = U.S. EPA Region 3 risk-based concentration for tap water.

^d = U.S. EPA Office of Solid Waste and Emergency Response ecological and toxicological thresholds (January 1996).

U.S. EPA Region 5 Resource Conservation and Recovery Act Division's Ecological Data Quality Levels (April 1998).

Analytical Data Source:

Southwest Laboratory of Oklahoma, Broken Arrow, Oklahoma.

SEDIMENT FIELD DATA LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

Sample			Sample Depth	CHICAGO, ILLINOIS
Designation	Sample Date	Sample Time	(ft bgs)	Comments
SED01	9/1/1998	1310	3	Sample collected from Indian Ridge Pond near pole #1, sample is organic sludge.
SED02	9/1/1998	1320	3	Sample collected from Indian Ridge Pond near pole #4, sample is organic sludge.
SED03	9/1/1998	1330	3	Sample collected from Indian Ridge Pond near pole #7, sample is organic sludge.
SED04	9/1/1998	1340	3	Sample collected from Indian Ridge Pond near pole #10, sample is organic sludge.
SED05	9/1/1998	1350		Sample collected from Indian Ridge Pond near pole #13, sample is organic sludge.
SED06	9/1/1998	1400	3	Sample collected from Indian Ridge Pond near pole #16, sample is organic sludge.
SED07	9/1/1998	1410	3	Sample collected from Indian Ridge Pond near pole #19, sample is organic sludge.
SED08	9/1/1998	1420	3	Sample collected from Indian Ridge Pond near pole #22, sample is organic sludge.
SED09	9/1/1998	1430	3	Sample collected from Indian Ridge Pond near pole #25, sample is organic sludge with clay.
SED10	9/1/1998	1440	1	Sample collected from Indian Ridge Pond near pole #28, sample is organic sludge.
SED11	9/2/1998	1520	3	Sample collected from Indian Ridge Pond near pole #31, sample is black organic matter and contains gravel.
SED12	9/2/1998	837	4	Sample collected from LHL#1 pond, sample is charcoal grey silty-clay and organic sludge.
SED13	9/2/1998	855	4	Sample collected from LHL#1 pond, sample is charcoal grey silty-clay.
SED14	9/2/1998	905	2.5	Sample collected from LHL#1 pond, sample is dark charcoal grey clayey-silt and contains plant roots.
SED15	9/2/1998	1020	4.5	Sample collected from LHL#2 pond, sample is grey/brown sandy-gravel and contains clay.
SED16	9/2/1998	1040	12	Sample collected from LHL#2 pond, sample is grey clay.
SED17	9/2/1998	1050	6	Sample collected from LHL#2 pond, sample is grey clay, contains gravel and has a petroleum odor.
SED18	9/2/1998	1420	1	Sample collected from southeast corner of southeast pond, sample is black organic silt.
SED19	9/2/1998	1440	1	Sample collected from northeast corner of southeast pond, sample is black organic silt.
SED20	9/2/1998	1615	0.5	Sample collected from pond near 122nd St. and Torrence Ave., sample is highly organic silt and contains debris.

Key:

ft bgs = Feet below ground surface.

Source: Ecology & Environment, Inc. site logbook.

SEDIMENT ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1 - 2, 1998

									EPTEMBI	ER 1 - 2, 19	98										
						····					ple Designa										
Parameter	SED01	SED02	SED03	SED04	SED05	SED06	SED07	SED08	SED09	SED10	SED11	SED12	DSED12	SED13	SED14	SED15	SED16	SED17	SED18	SED19	SED20
Metals (mg/kg)	= 400	0.000	5 2 40	6 400	4 6 5 6																10.000
Aluminum	7,180	8,300	6,340	6,480	6,850	8,050	8,760	8,340	13,300	7,390	11,300	9,410	12,600	11,500	9,330	7,590	14,200	15,600	9,140	11,600	19,200
Antimony	12.4	9.1 U	4.2 U	4.8	6.1	7.4 U	9.5 U	5.8 U	3.7 U	8.3 U	4.7 U	5 U	5.2 U	4.6 U	8.7 U	2.8 U	2.7 U	3 U	5.7 U	4.4 U	13.6 U
Arsenic	11.9	12 U	11.8	10.7	10	10.6	5.7	6.4	6.8	10.3	6.2	7.8	7.8	10.4 J	7.2 J	7.9 J	9.2 J	11.2 J	6.5 J	6.8 J	29.6 J
Barium	109	124	108	96.8	105	131	115	71.8	68	87.6	71.9	63.4	77.7	82.9	81.9	42.4	73.6	77.4	85.3	69.9	374
Beryllium	0.8 U	1 U	0.4 U	0.4 U	0.4 U	0.07 UJ	0.09 UJ	0.06 UJ	0.04 UJ	0.08 UJ	0.05 UJ	0.05 UJ	0.05	0.5	0.4	0.4	0.7	0.8	0.5	0.5	1.9
Cadmium	2.4 J	3.2 J	• • 1.9 J	1.6 J	2.2 J	3.2	3.4	2.2	0.6	5.8	1.5	1.1	1.6	0.4	1.1	0.1 U	0.1 U	0.1 U	0.4	0.2	3.2
Calcium	81,700	66,000	99,600	92,300	104,000	106,000	104,000	62,100	50,300	79,800	57,800	52,900	61,900	74,300	57,800	52,600	47,200	74,400	72,300	72,000	11,400
Chromium	67.3	67.1	36.9	34.9	33	37.9	32.1	26.6	32.3	37.6	37.2	32.2	39.9	44.1	56.2	20	33.1	42.7	55.3	55.6	64.3 J
Cobalt	10.1 J	11.3 J	10.4 J	9.8 J	10.8 J	10.7	14	11.7	15	12.7	12.8	11.1	13.4	14.4	11.9	9.8	14.6	15	13.6	. 12	13.8
Copper	84.8	91.8	54.5	55.4	57.6	68.1	59.9	46.1	51.6	67.9	57.9	48.6	60.3	59.3	64.7	25.4	49.2	56.5	71.6	58.9	131
Iron	34,700	40,900	31,400	32,000	31,100	31,600	28,000	22,700	27,600	35,600	24,100	20,400	26,000	27,300	26,700	18,100	25,800	26,900	25,400	24,000	43,600
Lead	205 J	237 J	119 J	97.2	108 J	148	95.8	71.8	65.8	155	132	113	137	137	177	23.5	67.3	93.4	114	87.3	539
Magnesium	10,900	10,200	15,000	15,000	13,000	15,600	13,100	14,900	21,100	12,800	18,200	15,300	19,400	19,100	14,500	23,300	21,500	23,800	22,100	21,800	5,500
Manganese	1,020	919	1,110	1,000	1,190	1,670	1,370	890	692	1,350	786	698	816	832	712	419	587	701	842	713	365
Mercury Nickel	0.5 U	0.6 U	0.9	0.3 U	0.4 U	0.3 U	0.2 U	0.2 U	0.1 U	0.2 U	0.1 U	0.4 J	0.2 J	0.2 U	0.3 J	0.07 U	0.2 J	0.2 J	0.5 J	0.5 J	0.9 J
Potassium	32.4	34.6	28.3	27.9	30.1	29.2	32.2	29.6	42.8	33.2	39.4	34.6	43.2	44	49.4	24.3	39.3	40.5	38.3	34.4	49.8
Selenium	2,160 7.7 U	2,500 9.3 U	2,440 4.3 U	1,960 3.8 U	2,200 4.1 U	2,660	2,990	2,710	3,970	1,870	3,450	2,980	3,940	3,180	3,160	2,430	4,330	4,950	4,210 2.8 U	4,900 2.1 U	2,910 8.7
Silver	3 U	3.7 U	1.7 U	1.5 U	1.6 U	3.1 1.7 U	3.6 U 2.7 J	2.4 1.3 U	1.4 U	4.2	1.8 U	2.3	2.4	2.2 U 0.7 U	4.3 U	1.4 U	1.3 U	1.5 U	0.8 U	0.6 U	2 U
Sodium	2,870	3,380	3,750	1,120	1,710	1,330	1,290	911	0.8 U 412	2.7 J 1,210	1.1 U 307	1.2 U 332	1.2 U 443	164 U	1.3 U 314 U	0.4 U 131	0.4 U 222	0.4 U 288	3,270	3,940	
Thallium	12.7 U	15.4 U	7.1 U	6.3 U	6.8 U	4.8 UJ	6.2 U	3.8 UJ	2.4 U	5.4 U	3 UJ	3.2 U	3.4 UJ	2.9 U	5.5 U	1.8 U	1.8	1.9 U	3,270 3.6 U	2.8 U	8.5 U
Vanadium	27.8	28.2	27.5	25.6	28.2	23.9 J	21.5 J	21.5 J	30.4	25.5 J	32.4	28.3	3.4 03	36.9	39.5	20.6	35.6	41.6	41.7	48.9	73.1
Zinc	1,060	1,190	795	798	1,200	597 J	1,160 J	759 J	195 J	1,170 J	437 J	377 J	451 J	516 J	684 J	85.6	136 J	216 J	264 J	175 J	986
Volatile Organic Compounds		1,170	,,,,,	,,,,,,	1,200	337 01	1,100 5	755 0	175 5	1,1703	757 3	3773	451.5	31031	0013		15031	2103	2013	1.00	1 ,00
1,1,1,2-Tetrachloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 U	29 U	33 U	36 UJ	43 U	71 U	20 UJ	19 R	28 UJ	27 U	17 U
1,1,1-Trichloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U
1,1,2-Trichloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	
1,1-Dichloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	
1,1-Dichloroethene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	
1,2-Dichloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U
1,2-Dichloroethene, total	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U
1,2-Dichloropropane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U
2-Butanone	210 J	110 UJ	56 UJ	56 UJ	62 UJ	50 UJ	59 UJ	29 U	23 UJ	56	20 U	100	66	36 U	43 U	71 U	20 U	19 R	52	140	17 U
2-Hexanone	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 U	29 U	33 U	36 UJ	43 U	71 U	20 U	19 R	28 U	27 U	17 U
4-Methyl-2-pentanone	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 U	29 U	33 U	36 UJ	43 U	71 U	20 U	19 R	28 U	27 U	17 U
Acetone	1,200 J	700 UJ	270	230	310	230	390	180	310 J	590	210 J	630 J	380 J	40 J	73 J	430 J	150 J	19 R	300 J	1,000 J	240 J
Benzene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 UJ	29 UJ	33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	17 J	12 J	17 UJ
Bromodichloromethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U
Bromoform	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	
Bromomethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 UJ	29 UJ	33 UJ	36 U	43 U	71 UJ	20 U	19 R	28 U	27 UJ	
Carbon disulfide	91 UJ	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	24 J	33 U	36 UJ	43 UJ	71 U	20 UJ	19 R	28 UJ	30	
Carbon tetrachloride	91 U	110 U	5 6 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	
Chlorobenzene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 UJ	29 UJ	33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	28 UJ	27 UJ	
Chloroethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 UJ	29 UJ	33 UJ	36 U	43 U	71 UJ	20 U	19 R	28 U	27 UJ	
Chloroform	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U	27 U	17 U

SEDIMENT ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

SEPTEMBER 1 - 2, 1998

	 								SEPTEMB	ER 1 - 2, 1	998										
											ple Design										
Parameter	SED01	SED02	SED03	SED04	SED05	SED06	SED07	SED08	SED09	SED10	SED11	SED12	DSED12	SED13	SED14	SED15	SED16	SED17	SED18	SED19	SED20
Chloromethane	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U		29 U	33 U		43 U	71 U	20 U	19 R	. 28 U	27 U	17 U
cis-1,3-Dichloropropene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U		29 U	33 U		43 U	71 U	20 U	19 R	28 U	27 U	
Dibromochloromethane	91 U	110 U	56 U	56 U	62 U	50 U	. 59 U	29 U	23 UJ	43 U			33 U		43 U	71 U	20 U	19 R	28 U		
Ethylbenzene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 UJ		33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	28 UJ		
Methylene chloride	50 J	66 J	12 J	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U			33 U	36 U	43 U	71 U	20 U	19 R			
Styrene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ			33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	28 UJ		17 UJ
Tetrachloroethene	9 1 U	110 U	, 56 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ		29 U	33 U	36 UJ	43 U	71 U	20 U	19 R			17 U
Toluene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	9 J	43 UJ	20 UJ		33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	4 J		17 UJ
trans-1,3-Dichloropropene	91 U	110 U	56 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U		33 U	36 U	43 U	71 U	20 U	19 R	28 U		17 U
Trichloroethene	91 U	110 U	5 6 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U		33 U	36 U	43 U	71 U	20 U	19 R	28 U		17 U
Vinyl chloride	91 U	110 U	5 6 U	56 U	62 U	50 U	59 U	29 U	23 UJ	43 U	20 U	29 U	33 U	36 U	43 U	71 U	20 U	19 R	28 U		17 U
Xylenes	91 U	110 U	5 6 U	56 U	62 U	50 U	59 U	29 U	23 R	43 UJ	20 UJ	29 UJ	33 UJ	36 UJ	43 UJ	71 UJ	20 UJ	19 R	11 J		17 UJ
Semivolatile Organic Compou																					
1,2,4-Trichlorobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 UJ
1,2-Dichlorobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	140 J	620 U	93 J	4,800 U	850 U	990 U
1,3-Dichlorobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
1,4-Dichlorobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 UJ
2,4,5-Trichlorophenol	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 U	3,500 U	2,000 U	1,625 U	3,500 U	1,800 U	1,825 U	1,775 U	1,925 U	12,750 U	950 U	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
2,4,6-Trichlorophenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2,2'-oxybis-(1-Chloropropan		3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 UJ	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2,4-Dichlorophenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2,4-Dimethylphenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2,4-Dinitrophenol	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 U	3,500 U	2,000 U	1,625 U	3,500 U	1,800 UJ	1,825 UJ	1,775 UJ	1,925 U	12,750 UJ	950 UJ	1,550 UJ	1,550 UJ	12,000 UJ	2,125 UJ	2,475 U
2,4-Dinitrotoluene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2,6-Dinitrotoluene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 UJ
2-Chloronaphthalene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2-Chlorophenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2-Methylnaphthalene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	100 J	1,400 U	800 U	650 U	430 J	600 J	85 J	710 U	770 UJ	5,100 U	230 J	620 U	300 J	4,800 U	850 U	990 U
2-Methylphenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	240 J	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
2-Nitroaniline	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 U	3,500 U	2,000 U	1,625 U	3,500 U	1,800 U	1,825 U	1,775 U	1,925 UJ	12,750 U	950 U	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
2-Nitrophenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
3,3'-Dichlorobenzidine	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
3-Nitroaniline	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 U	3,500 U	2,000 U	1,625 U	3,500 U	1,800 UJ	1,825 UJ	1,775 UJ	1,925 UJ	12,750 U	950 UJ	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
4,6-Dinitro-2-methylphenol	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 U	3,500 U	2,000 U	1,625 U	3,500 U	1,800 UJ	1,825 UJ	1,775 UJ	1,925 U	12,750 UJ	950 UJ	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
4-Bromophenyl-phenylether	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 UJ	730 UJ	710 UJ	770 UJ	5,100 U	380 UJ	620 UJ	620 UJ	4,800 UJ	850 UJ	990 UJ
4-Chloro-3-methylphenol							1,400 U	800 U		1,400 U	720 U	730 U	710 U		5,100 U	380 U	620 U	620 U		850 U	990 U
4-Chlorophorol plants		3,200 U			1,900 U	900 UJ		800 U	650 U	380 J	720 U	730 U	710 U	770 UJ	5,100 J	380 U	620 U	620 U	4,800 U	850 U	990 U
4-Chlorophenyl-phenylether		3,200 U		1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
4-Methylphenol		3,200 U		1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	310 J	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
4-Nitroaniline		8,000 U		4,250 U	4,750 U		3,500 U	2,000 U	1,625 U	3,500 U	1,800 UJ			1,925 UJ		950 UJ	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
4-Nitrophenol		8,000 U		4,250 U	4,750 U	2,250 U		2,000 U	1,625 U	3,500 U	1,800 U	1,825 U	1,775 U	1,925 U		950 U	1,550 U		12,000 U	2,125 U	2,475 U
Acenaphthene		3,200 U		1,700 U	1,900 U	900 U	1,400 U	800 U	66 J	190 J	110 J	730 U	710 U	770 UJ	5,100 U	1,300	620 U	280 J	4,800 U	850 U	990 U
Acenaphthylene		3,200 U		1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	740	620 U	220 J	4,800 U	850 U	990 UJ
Anthracene	310 J	3,200 U	1,900 U	210 J	230 J	160 J	160 J	120 J	140 J	610 J	170 J	140 J	83 J	80 J	5,100 U	940	160 J	280 J	4,800 U	110 J	990 U
Benzo[a]anthracene	1,200 J	830 J	410 J	710 J	610 J	540 J	430 J	400 J	470 J	1,300 J	440 J	350 J	260 J	240 J	5,100 U	460	530 J	430 J	790 J	190 J	210 J
Benzo[a]pyrene	1,300 J	990 J	480 J	810 J	640 J	600 J	520 J	450 J	480 J	1,500	430 J	320 J	230 J	210 J	5,100 U	370 J	440 J	370 J	660 J	160 J	220 J

SEDIMENT ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE

									CHICAGO), ILLINO	IS
									EPTEMB	ER 1 - 2, 19	<u>99</u>
Downers of an	CEPOA									Sam	pl
Parameter	SED01	SED02	SED03	SED04	SED05	SED06	SED07	SED08	SED09	SED10	Г
nzo[b]fluoranthene	2,300 J	1,600 J	680 J	1,400 J	1,000 J	980	830 J	760 J	770	2,500	Г
nzo[g,h,i]perylene	600 J	430 J	1,900 U	310 J	280 J	310 J	210 J	170 J	180 J	510 J	Г
nzo[k]fluoranthene	630 J	560 J	430 J	540 J	410 J	380 J	400 J	270 J	340 J	830 J	-
(2-chloroethoxy)methane	2 500 II	2 200 II	1 000 II	1 700 II	1 000 TT	000 77	1 400 77	200 7	2103	0503	_

								<u> </u>	DET TEME		ple Design	ation									
Parameter	SED01	SED02	SED03	SED04	SED05	SED06	SED07	SED08	SED09	SED10	SED11	SED12	DSED12	SED13	SED14	SED15	SED16	CEDIA	CED10	CEDIA	CEPAA
Benzo[b]fluoranthene	2,300 J	1,600 J	680 J	1,400 J	1,000 J	980	830 J	760 J	770	2,500	700 J	470 J	310 J	360 J				SED17	SED18	SED19	SED20
Benzo[g,h,i]perylene	600 J	430 J	1,900 U	310 J	280 J	310 J	210 J	170 J	180 J	510 J	440 J	290 J		110 J	5,100 U 5,100 UJ	320 J	590 J	480 J	920 J	260 J	310 J
Benzo[k]fluoranthene	630 J	560 J	430 J	540 J	410 J	380 J	400 J	270 J	340 J	830 J	240 J	180 J		150 J		380 U	370 J	250 J	4,800 U	850 U	990 U
Bis(2-chloroethoxy)methane	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U		770 UJ	5,100 U	130 J	260 J	190 J	4,800 U	88 J	120 J
Bis(2-chloroethyl)ether	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U		770 UJ	5,100 U 5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Bis(2-ethylhexyl)phthalate	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	90 J	190 J	150 J	160 J	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Butylbenzylphthalate	2,500 U	3,200 U	,1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ		600	340 J	540 J	1,300 J	560 J	990 U
Carbazole	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	170 J	88 J	730 U	710 U	770 UJ	5,100 U 5,100 U	44 J		620 U	4,800 U	850 U	990 U
Chrysene	1,500 J	1,100 J	620 J	910 J	650 J	730 J	520 J	430 J	580 J	1,700	550 J	330 J	230 J	260 J		44 J 380		620 U	4,800 U	850 U	990 U
Di-n-butylphthalate	2,500 U	440 J	250 J	1,700 U	200 J	120 J	210 J	97 J	650 U	170 J	720 U	730 U	710 U	770 UJ	5,100 U 5,100 U		550 J	460 J	810 J	290 J	270 J
Di-n-octylphthalate	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	54 J 380 U	620 U	620 U	4,800 U	850 U	990 U
Dibenz[a,h]anthracene	260 J	3,200 U	1,900 U	1,700 U	1,900 U	120 J	1,400 U	800 U	78 J	280 J	160 J	100 J	86 J	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Dibenzofuran	2,500 U	3,200 U	1,900 U	200 J	1,900 U	120 J	160 J	120 J	77 J	460 J	720 U	100 J	83 J	770 UJ	5,100 U		120 J	99 J	4,800 U	850 U	990 U
Diethylphthalate	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	42 J 380 U	64 J	620 U	4,800 U	850 U	990 U
Dimethylphthalate	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U 620 U	620 U	4,800 U	850 U	990 U
Fluoranthene	2,100 J	1,500 J	770 J	1,500 J	1,400 J	900	850 J	720 J	720	2,200	730	620 J	450 J	390 J	5,100 U	270 J		620 U	4,800 U	850 U	990 U
Fluorene	290 J	3,200 U	1,900 U	300 J	1,900 U	160 J	230 J	170 J	110 J	550 J	130 J	140 J	98 J	97 J	5,100 U	1,400	890 78 J	620 U	1,500 J	380 J	350 J
Hexachlorobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 UJ	730 UJ	710 UJ			380 UJ	620 UJ	290 J	4,800 U	110 J	990 U
Hexachlorobutadiene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 UJ	730 UJ	710 UJ	770 UJ	5,100 U	380 UJ	620 UJ	620 UJ		850 UJ	990 UJ
Hexachlorocyclopentadiene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 UJ	730 UJ	710 UJ	770 UJ	5,100 U	380 UJ	620 UJ	620 UJ 620 UJ		850 UJ	990 UJ
Hexachloroethane	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U		850 UJ	990 UJ
Indeno[1,2,3-cd]pyrene	630 J	460 J	210 J	320 J	310 J	310 J	240 J	200 J	210 J	630 J	380 J	260 J	200 J	96 J	5,100 U	380 U	350 J	260 J	4,800 U 510 J	850 U	990 U
Isophorone	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	140 J 850 U	170 J 990 U
Naphthalene	370 J	3,200 U	1,900 U	260 J	230 J	150 J	190 J	110 J	650 U	970 J	360 J	120 J	100 J	94 J	5,100 U	250 J	620 U	390 J	4,800 U	110 J	990 U
N-Nitroso-di-n-propylamine	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 UJ
N-Nitrosodiphenylamine	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Nitrobenzene	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 UJ	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Pentachlorophenol	6,250 U	8,000 U	4,800 U	4,250 U	4,750 U	2,250 UJ	3,500 U	2,000 U	1,625 U	3,400 R	1,800 U	1,825 U	1,775 U	1,925 UJ 1		950 UJ	1,550 U	1,550 U	12,000 U	2,125 U	2,475 U
Phenanthrene	1,300 J	860 J	400 J	770 J	550 J	450 J	480 J	390 J	440 U	1600	910	390 J	280 J	250 J	5,100 U	1,700	560 J	840	900 J	320 J	2,473 U 250 J
Phenol	2,500 U	3,200 U	1,900 U	1,700 U	1,900 U	900 U	1,400 U	800 U	650 U	1,400 U	720 U	730 U	710 U	770 U	5,100 U	380 U	620 U	620 U	4,800 U	850 U	990 U
Pyrene	1,900 J	1,400 J	720 J	1,100 J	870 J	1100	690 J	620 J	730	2,000 J	720	590 J	410 J	380 J	5,100 U	380 U	880	620 U	1,300 J	410 J	340 J
Polychlorinated Biphenyls (µg)														2001	2,100 0	300 01	000	020 01	1,300 J	410 J	340 J
Aroclor 1016	253.5 U	331.5 U		173.55 U	195 U	91.65 U	142.35 U	79.95 U	64.35 U	138.45 U	107.25 U	72.15 U	72.15 U	78 U	100 UJ	37.05 U	62.4 U	62.4 UJ	97.5 U	83.85 U	99.45 U
Aroclor 1221	513.5 U	671.5 U		351.55 U		185.65 U	288.35 U	161.95 U					146.15 U	158 U	200 UJ	75.05 U	126.4 U	126.4 UJ	197.5 U	169.85 U	201.45 U
Aroclor 1232	253.5 U	331.5 U		173.55 U	195 U		142.35 U			138.45 U	107.25 U	72.15 U	72.15 U	78 U	100 UJ	37.05 U	62.4 U	62.4 UJ	97.5 U	83.85 U	99.45 U
Aroclor 1242	253.5 U	331.5 U		173.55 U	195 U	91.65 U		79.95 U	64.35 U		107.25 U	72.15 U	72.15 U	78 U		37.05 U	62.4 U	62.4 UJ		83.85 U	
Aroclor 1248			191.1 U				142.35 U	79.95 U	64.35 U	138.45 U	107.25 U	72.15 U	72.15 U	78 U		37.05 U	62.4 U	62.4 U		83.85 U	
Aroclor 1254			191.1 U		195 U	91.65 U	142.35 U	79.95 U	64.35 U	38.45 U	107.25 U	113 J	72.15 U	91 J		37.05 U	193 J	200 J	180 J		
Aroclor 1260	253.5 U	331.5 U	191.1 U	173.55 U	195 U	91.65 U	142.35 U	79.95 U	64.35 U	138.45 U	107.25 U		72.15 U	78 U		37.05 U	62.4 U	62.4 U	97.5 U		
Pesticides (µg/kg)																200	02.T U	02.7 0	71.50	03.63 ()	22.43 U
4,4'-DDD	183	329	86	79	82	140	78	8 U	24	13.85 U	131	26	22	50	24 J	3.71 U	8.1	8.5 J	12 J	9.6 J	204
4,4'-DDE	48 J	74 J	44 J	52	46 J	43 J	32	27 J		13.85 U	15 J	9.4 J	6.2 J	18	25 10	3.71 U	6.24 U	6.24 UJ	12 J	9.6 J 12 J	204
4,4'-DDT	56	144 J	23	17.35 J	19.5 U	9.16 U	14.24 U	8 U		13.85 U	10 J	7.22 U	7.22 U	7.8 U	10 UJ	3.71 U	6.24 U	6.24 UJ	9.75 U	8.39 U	
Aldrin	12 J	24 J	15	15 J	18 J	4.7 U	7.3 U	4.1 U	3.3 U	7.1 U	5.5 U	3.7 U	3.7 U	4 U	5.2 UJ	1.9 U	3.2 U	3.2 UJ	9.73 U	4.3 U	
alpha-BHC	13 U	17 U	9.8 U	8.9 U	10 U	4.7 U	7.3 U	4.1 U	3.3 U	7.1 U	5.5 U	3.7 U	3.7 U	4 U	8.8 J	1.9 U	3.2 U	3.2 UJ	14 J	4.3 U	5.1 U 5.1 U
alpha-Chlordane	13 U	17 U	9.8 U	8.9 U	10 U	4.7 U	7.3 U	4.1 U	3.3 U	7.1 U	5.5 U	3.7 U	3.7 U	4 U	5.2 UJ	1.9 U	3.2 U	3.2 UJ	30 J	4.3 U	5.1 U

SEDIMENT ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS **SEPTEMBER 1 - 2, 1998**

SED01	CEDO	CED02	CEDO4	CED OF I	~~~~~~ I					ple Designa	tion									
			SED04	SED05	SED06	SED07	SED08	SED09	SED10	SED11	SED12	DSED12	SED13	SED14	SED15	SED16	SED17	SED18	SED19	SED20
13 U	17 U	9.8 U	8.9 U	10 U	4.7 U	7.3 U	4.1 U	3.3 U	7.1 U	5511	3711	3711	4 11	5 2 111	1.011	2 2 11				
13 U	17 U	9.8 U	17 J	10 U	6.6 J	7.3 U			7 1 11											
25.35 U	33.15 U	19.11 U	23	22 1					7.1 0											
13 IJ	17 []								04							6.24 U	6.24 UJ	9.75 U	8.39 U	9.95 L
	33 15 III								42				4 U	5.2 UJ	1.9 U	3.2 U	3.2 UJ	5 U	4.3 U	5.1 U
									298	10.73 U			7.8 U	10 UJ	3.71 U	6.24 U	6.24 UJ	9.75 U	8.39 U	9.95 L
							37 J	6.43 U	25	10.73 U	7.22 U	7.22 U	7.8 U	10 UJ	3.71 U	6.24 U	6.24 UJ	9.75 U	8.39 U	9.95 L
				19.5 U	9.16 U	14.24 U	8 U	6.43 U	13.85 U	25 J	7.22 U	7.22 U	7.8 U	10 UJ	3.71 U	6.24 II				9.95 U
	33.15 U	19.11 U	17.35 U	19.5 U	9.16 U	14.24 U	8 U	6.43 U	13.85 U	10.73 U										9.95 U
25.35 U	33.15 U	19.11 U	17.35 U	19.5 U	9.16 U	14.24 U	8 U	6.43 U												
13 U	17 U	9.8 U	8.9 U	10 U	4.7 U	7.3 U	4111													9.95 U
13 U	17 U	9.8 U	8.9 U	10 II																5.1 U
13 U																	2.6 J		4.3 U	5.1 U
															1.9 U	3.2 U	3.2 UJ	5 U	4.3 U	5.1 UJ
												3.7 U	4 U	5.2 UJ	1.9 U	3.2 U	3.2 UJ	6.5 J	3.7 J	5.1 U
									71 U	55 U	37 U	37 U	40 U	52 UJ	19 U	32 U	32 UJ	50 U	43 U	51 U
1,300 0	1,700 U	980 U	890 U	1,000 U	470 U	730 U	410 U	330 U	710 U	550 U	370 U	370 U	400 U	520 UJ	190 U	320 U				510 U
	25.35 U 13 U 25.35 U 25.35 U 25.35 U 25.35 U 25.35 U	13 U 17 U 13 U 17 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 25.35 U 33.15 U 13 U 17 U 13 U 17 U 13 U 17 U 13 U 17 U 13 U 17 U 13 U 17 U 13 U 17 U	13 U 17 U 9.8 U 13 U 17 U 9.8 U 25.35 U 33.15 U 19.11 U 13 U 17 U 9.8 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 25.35 U 33.15 U 19.11 U 13 U 17 U 9.8 U 13 U 17 U 9.8 U 13 U 17 U 9.8 U 13 U 17 U 9.8 U 13 U 17 U 9.8 U 13 U 17 U 9.8 U	13 U 17 U 9.8 U 8.9 U 13 U 17 U 9.8 U 17 J 25.35 U 33.15 U 19.11 U 23 13 U 17 U 9.8 U 8.9 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 25.35 U 33.15 U 19.11 U 17.35 U 13 U 17 U 9.8 U 8.9 U 13 U 17 U 9.8 U 8.9 U 13 U 17 U 9.8 U 8.9 U 13 U 17 U 9.8 U 8.9 U 13 U 17 U 9.8 U 8.9 U	13 U 17 U 9.8 U 8.9 U 10 U 13 U 17 U 9.8 U 17 J 10 U 25.35 U 33.15 U 19.11 U 23 22 J 13 U 17 U 9.8 U 8.9 U 10 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 13 U 17 U 9.8 U 8.9 U 10 U 13 U 17 U 9.8 U 8.9 U 10 U 13 U 17 U 9.8 U 8.9 U 10 U 13 U 17 U 9.8 U 8.9 U 10 U	13 U 17 U 9.8 U 8.9 U 10 U 4.7 U 13 U 17 U 9.8 U 17 J 10 U 4.7 U 25.35 U 33.15 U 19.11 U 23 22 J 20 13 U 17 U 9.8 U 8.9 U 10 U 4.7 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 19.5 U 9.16 U 25.35 U 33.15 U 19.11 U 17.35 U 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SED08 SED09 SED10 SED11 SED12 DSED12 SED13 SED14 SED15 SED16	SED01 SED02 SED03 SED04 SED05 SED06 SED07 SED08 SED09 SED10 SED11 SED12 SED12 SED13 SED14 SED15 SED16 SED17	SED01 SED02 SED03 SED04 SED05 SED06 SED06 SED08 SED09 SED10 SED11 SED12 DSED12 SED13 SED14 SED15 SED16 SED17 SED18	SED01 SED02 SED03 SED04 SED06 SED06 SED06 SED06 SED06 SED09 SED10 SED11 SED12 SED12 SED13 SED14 SED15 SED16 SED16 SED17 SED18 SED19

Key:

mg/kg Milligrams per kilogram. μg/kg Micrograms per kilogram. U

The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample. UJ

The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of quantitation

necessary to accurately and precisely measure the analyte in the sample.

R The data are unusable.

Note: Sample DSED12 is a duplicate of sample SED12.

Analytical Data Sources:

Inorganics:

Contract Laboratory Program, Incheape Testing Service and Environmental Laboratory, Colchester, Vermont.

Organics:

Contract Laboratory Program, Ceimic Corporation, Narragansett, Rhode Island.

SURFACE WATER FIELD DATA LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

			CHICAGO, ILLINOIS
Sample	Sample	Sample	
Designation	Date	Time	Comments
SW01	9/1/1998	1100	Sample collected from Indian Ridge Pond near pole #1.
SW02	9/1/1998	1105	Sample collected from Indian Ridge Pond near pole #4.
SW03	9/1/1998	1110	Sample collected from Indian Ridge Pond near pole #7.
SW04	9/1/1998	1115	Sample collected from Indian Ridge Pond near pole #10.
SW05	9/1/1998	1120	Sample collected from Indian Ridge Pond near pole #13.
SW06	9/1/1998	1125	Sample collected from Indian Ridge Pond near pole #16, visable sheen extends north from SW06 to SW11.
SW07	9/1/1998	1130	Sample collected from Indian Ridge Pond near pole #19.
SW08	9/1/1998	1135	Sample collected from Indian Ridge Pond near pole #22.
SW09	9/1/1998	1140	Sample collected from Indian Ridge Pond near pole #25.
SW10	9/1/1998	1145	Sample collected from Indian Ridge Pond near pole #28.
SW11	9/1/1998	1445	Sample collected from Indian Ridge Pond near pole #31, collected after sediment sample.
SW12	9/2/1998	837	Sample collected from LHL#1 pond, sample collected 2 inches below water surface.
SW13	9/2/1998	855	Sample collected from LHL#1 pond, sample collected 2 inches below water surface.
SW14	9/2/1998	905	Sample collected from LHL#1 pond, sample collected 2 inches below water surface.
SW15	9/2/1998	1020	Sample collected from LHL#2 pond, sample collected 2 inches below water surface.
SW16	9/2/1998	1040	Sample collected from LHL#2 pond, sample collected 2 inches below water surface.
SW17	9/2/1998	1050	Sample collected from LHL#2 pond, sample collected 2 inches below water surface.
SW18	9/2/1998	1420	Sample collected from southeast corner of southeast pond, sample collected 2 inches below water surface and is brown with a sheen.
SW19	9/2/1998	1440	Sample collected from northeast corner of southeast pond, sample collected 2 inches below water surface and is brown with a sheen.
SW20	9/2/1998	1615	Sample collected from pond near 122nd St. and Torrence Ave., sample collected 2 inches below water surface and contains algae.

Source: Ecology & Environment, Inc. Site logbook.

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1-2 1998

									SEPTEM	IBER 1-2 1	998											
Parameter	SW01	SW02	SW03	SW04	SW05	SW06	SW07	CANOO	CITION	CITIA		esignation	2222									
Metals (μg/L)	1 5 11 01	51102	51105	51104	31103	3000	3007	SW08	SW09	SW10	SW11	DW11	SW12	DW12	SW13	SW14	SW15	SW16	SW17	SW18	SW19	SW20
Aluminum	44.4 U	44.4 U	140 J	102 J	44.4 U	44.4 U	44.4 U	72.8 J	217 J	51 2 T	C1 0 T	100 1	1.55 1	100 7	2.2.5			г				
Antimony	4.3	3.7 U	3.7 U	3.7 U	3.7 U	4.1	3.7 U	5.2	3.7 U	51.3 J 3.7 U	61.2 J 3.7 U	122. J	157 J	182. J	249 J	231 J	334 J	279 J	189 J	181 J	120 J	73,600
Arsenic	6.3	4.9 U	4.9 U		4.9 U	5.3	4.9 U	4.9 U	4.9 U	3.7 0		3.7 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	32.8
Barium	89.8	91.2	99.9		98.6	98.5	106	117	123	122	4.9 U 94.1	4.9 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	17.2	16.2	98.5
Beryllium	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	104 0.4 U	60.3	58.3	53.8	56.9	70.4	82.4	73.5	144	153	
Cadmium	0.4 U	0.4 U	, Q.4 U	. 0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 UJ	0.1 UJ 0.7 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 UJ	4.6]
Calcium	69,700	69,500	69,900	75,000	78,000	76,100	78,800	81,600	78,200	84,700	83,200	91,900	44,200	1.1	40,800	0.7 U	0.7 U	05.600	0.7 U	0.7 Ü	0.7 U	27.4
Chromium	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 UJ	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.3 J	1.2 U	42,200 1.2 U	1.2 U	44,800	72,800	85,600	76,300	34,700	36,500	
Cobalt	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 UJ	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	1.2 U	1.2	1.2 U	1.3	71.9	73.5	473
Copper	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	2.3 U 3.7 U	2.3 U	2.3 U	2.3 U	17	17.1	45.8
Iron	467	398	849	807	1,120	773	642	795	1,350	1,020	957	1,270	132. J	112 J	108 J	127 J	3.7 U 232 J	3.7 U	3.7 U	3.9	4.3	
Lead	1.9 U	1.9 U	2.70	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1,270 1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	146 J 1.9 U	84.5 J 1.9 U	548	537	
Magnesium	52,800	52,500	51,600	55,300	55,500	53,200	54,700	54,400	51,300	47,400	43,200	47,200	50,900	48,500	47,200	51,800	44,900	52,800	47,000	3.7 55,500	2.6	
Manganese	573	588	683	521	480	502	494	586	652	900	698	793	55.1	52.5	49.8	53.5	31.9	32,800	47,000	139	58,600 145	58,800 5,070
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Nickel	3.5	3.2	3.2	3.5	3.9	3.8	3.9	3.1 U	3.7	3.1 U	3.1 U	3.1 U	4.00	5	4.3	5.2	11.1	13.4	9.6	69.7	75.6	
Potassium	30,600	30,400	30,900	33,600	34,900	33,400	34,200	33,700	31,200	26,900	24,000	25,900	16,800	17,000	16,200	17,600	26,600	31,800	28,000	412,000	44,200	20,300
Selenium	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	4.7 J	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	15.90
Silver	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.9 J	2.3 U	3.2 J
Sodium	121,000	130,000	129,000	131,000	136,000	126,000	129,000	131,000	116,000	99,400	90,900	98,800	38,700	37,200	35,900	40,200	11,900	144,000	121,000	189,000	182,000	67,600
Thallium	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 U	6.5 UJ
Vanadium	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	2.4 U	2.4 U	2.4 U	2.4 UJ	2.4 UJ	2.4 U	2.4 U	19.5 J	21.4 J	291
Zinc	5.00	17.2	19.4	9.4	22.4	13.5	6	12.4	8.9	5.3	13.4	20.3	12.8 J	9 J	7.2 J	9.6 J	6.4 J	5.1 J	3.8 J	27.3	31.5	8,960
Volatile Organic Compounds (μg/L)											L						0.70	0.10	5.00	27.5	31.5	0,700
1,1,1,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene, total	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10.U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 Ù	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 Ü	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	7 J	14	37	10 U	10 U	12 J	12 J	9 J	12 J	5 J	7 5 22 J	4 J	10 J	10 UJ	12 J
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	· 10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1-2 1998

	SEPTEMBER 1-2 1998																					
Parameter	CWO1	CITION	CITION	CTT/O4	CYNOR	CTTIO		~~~~														
															SW13	SW14	SW15	SW16	SW17	SW18	SW19	SW20
Chloromethane cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
Methylene chloride	10 U	6 J	2 J	1 J	10 U	10 U	3 J	1 J	3 J	2 J		3 Ј	5 J	5 J	2 J	3 J	10 U	2 J	1 J	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	, 10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	2 J	1 J	10 U	2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	4 J	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes	10 U	10 U	2 J	1 J	10 U	1 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semivolatile Organic Compounds (μ																						
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis-(1-Chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 UJ	25 U.
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 Ú	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 L
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 L
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 U.
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 U.
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

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									SEI IEI	MBER 1-2		esignation										
Parameter Parameter	SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW08	SW09	SW10	SW11	DW11	SW12	DW12	SW13	SW14	SW15	SW16	SW17	CVV10	CVV10	CYTYAO
Benzo[b]fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U						SW18	SW19	SW20
Benzo[g,h,i]perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[k]fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U 10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	, -10 U	• 10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	1 J 10 U	10 U 10 U	10 U
Dibenz[a,h]anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U 10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 J	10 U	10 U
Polychlorinated Biphenyls (µg/L)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor 1016	0.55.77	0.00.11	2 22 2-1																			
Aroclor 1010 Aroclor 1221	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U	0.98 U	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ
Aroclor 1232	19.75 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U	19.75 U	1.98 U	1.98 U	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ	1.98 UJ
Aroclor 1232 Aroclor 1242	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U	0.98 U	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ
Aroclor 1248	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U		0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ		0.98 UJ
Aroclor 1254	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U	0.98 U	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ
Aroclor 1260	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U	0.98 U	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ
Pesticides (µg/L)	9.75 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	9.75 U	0.98 U	0.98 U	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ	0.98 UJ
4,4'-DDD	0.00 11	0 1 77	0 1 77	0.1.11	01	0 (==1																
4,4'-DDE	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 J	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.03 J	0.1 UJ	0.28 J
4,4'-DDT	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.004 J	0.01 J	0.11 J
Aldrin	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.002 J	0.004 J	0.07 J
alpha-BHC	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
alpha-Chlordane	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.05 U				0.05 UJ		0.05 UJ		0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
aipiii Cilioi dalic	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.004 J	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1-2 1998

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Donomatan	CYTYG4 I		~~~~								Sample De	esignation										
Parameter Parameter	SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW08	SW09	SW10	SW11	DW11	SW12	DW12	SW13	SW14	SW15	SW16	SW17	SW18	SW19	SW20
beta-BHC	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 []]	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	
delta-BHC	0.5 U	0.05 U	0.0039 J	0.01 J	0.05 U	0.05 U	0.05 U	0.05 U		0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 111	0.05 UJ	0.05 UJ	0.05 UJ	0.05 J	0.05 U
Dieldrin	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 II	0.11	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.03 UJ	0.03 03	0.03 UJ	0.004 J	0.003 J	0.03 U
Endosulfan I	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.1 03	0.05 UJ	0.05 UJ	0.01 J	0.05 UJ	
Endosulfan II	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 UJ		0.03 UJ	0.03 UJ	0.03 03	0.03 03	0.03 UJ	0.013	0.03 UJ	0.03 U
Endosulfan sulfate	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 U	0.1 U	0.1 UJ		0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 0J	0.1 0J	
Endrin	0.98 U	0.1 U	.0.1 U	. 0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 U	0.1 U	0.1 03	0.1 UJ	0.1 UJ	0.002 J	0.1 UJ	0.1 03				0.1 U
Endrin aldehyde	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.98 U	0.1 U	0.1 U	0.1 03	0.1 03				0.1 03	0.1 UJ	0.02 J	0.02 J	0.01 J
Endrin ketone	0.98 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 0	0.98 U	0.1 U		0.1 UJ	0.1 03	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.03 J	0.1 UJ	0.1 UJ
gamma-BHC (Lindane)	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0038 J	0.05 U	0.05 U	0.5 U	0.05 U				0.1 W	0.1 UJ	0.1 UJ	0.1 03	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U
gamma-Chlordane	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	
Heptachlor	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ			0.05 UJ	0.05 UJ	0.05 UJ	
Heptachlor epoxide	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.5 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ		0.05 UJ	0.01 J		0.05 UJ
Methoxychlor	5 U	0.5 U	0.05 U	0.05 U		_	0.05 U	0.05 U		0.5 U	0.05 U	0.05 U	0.05 UJ		0.05 UJ	0.05 UJ				0.05 UJ		0.05 U
Toxaphene	50 U	5 U			0.5 U	0.5 U	0.5 U	0.5 U		5 U	0.5 U	0.5 U	0.5 UJ		0.5 UJ	0.5 UJ			0.5 UJ	0.02 J		0.5 U.
Tonipheix	30 0	2 0	5 U	5 U	5 U	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U.

T7	
K AV	۱

 $\mu g/L$ = Micrograms per liter.

NA = Not analyzed.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the action limit of

quantitation necessary to accurately and precisely measure the analyte in the sample.

The analyte was positively identified, but the pesticide/Arocolor target analyte had a difference greater than 25% for the detected concentrations between the two gas chromatigraph columns.

The lower of the two results is reported.

Note: Sample designations beginning with DW are duplicate samples.

Analytical Data Source:

JP

Inorganics:

Contract Laboratory Program, Incheape Testing Service and Environmental Laboratory, Colchester, Vermont.

Organics:

Contract Laboratory Program, CompuChem Environmental Corporation, Cary, North Carolina.

GROUNDWATER FIELD DATA LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

SEPTEMBER 1, 1998

		Sample Depth	
Sample Designation	Sample Time	(ft bgs)	Comments
GW1	1030		Sample collected using Geoprobe ^(R) , sample collected near flags # 60 and 66.
GW2	1200		Sample collected using Geoprobe ^(R) , sample collected near flag # 134
GW3	NR	6-8	Sample collected using Geoprobe ^(R) , sample collected near flag # 17.

Key:

ft bgs = Feet below ground surface.

NR = Not reported.

Source: Ecology & Environment, Inc. Site logbook.

GROUNDWATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1, 1998

	Som		tion
Parameter Parameter	GW1	ple Designa GW2	GW3
	I GWI	GYYZ	G 113
Metals (μg/L)	1 20'5 1	2 250	532 Ј
Aluminum	285 J 3.7 U	3,250 6.6	10 U
Antimony		16.4	6 U
Arsenic	4.9 U		
Barium	401	675	352
Beryllium	0.4 U	0.4 U	0.1 UJ
Cadmium	0.4 UJ	0.4 U	0.7 U
Calcium	518,000 3 J	169,000	132,000
Chromium		70.5	7.8 2.30 U
Cobalt	2.2 U	13.5	
Copper	3.7 U	168	8.2
Iron	16,400	35,400	2,230
Lead	2 222 222	251	19.6
Magnesium	232,000	136,000	87,500
Manganese	511	1,410	241
Mercury	NA	NA	0.1 U
Nickel	25.2	110	10
Potassium	78,400	378,000	64,800
Selenium	3.8 U	3.8 U	3.8 U
Silver	1.5 U	1.5 UJ	2.30 U
Sodium	364,000	1,460,000	255,000
Thallium	6.3 U	6.3 U	6.5 U
Vanadium	3.5 U	32.6	2.4 U
Zinc	19.4	341	41.8
Volatile Organic Compounds(μg/			
1,1,1,2-Tetrachloroethane	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	2 J
1,1-Dichloroethene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloroethene, total	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	6 J	8 J	6 J
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon disulfide	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	1 J
Chloroethane	10 U	10 U	16

GROUNDWATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1, 1998

	Sam	ple Design:	ation
Parameter	GW1	GW2	GW3
Chloroform	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Ethylbenzene	7 Ј	10 U	10 U
Methylene chloride	2 Ј	1 J	2 J
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	5 J	1 J	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U
Xylenes	35	10 U	10 U
Semivolatile Organic Compounds	(μg/L)		
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	. 10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,2'-oxybis-(1-Chloropropane)	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U

GROUNDWATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1, 1998

	Sam:	ple Designa	tion
Parameter	GW1	GW2	GW3
Benzo[a]anthracene	10 U	10 U	10 U
Benzo[a]pyrene	10 U	10 U	10 U
Benzo[b]fluoranthene	10 U	10 U	10 U
Benzo[g,h,i]perylene	10 U	10 U	10 U
Benzo[k]fluoranthene	10 U	10 U	10 U
Bis(2-chloroethoxy)methane	10 U	10 U	10 U
Bis(2-chloroethyl)ether	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U
Dibenz[a,h]anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethylphthalate	1 J	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
Naphthalene	2 Ј	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U
Phenol	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U
Polychlorinated Biphenyls (µg/L)			
Aroclor 1016	0.98 U	0.98 U	0.98 U
Aroclor 1221	1.98 U	1.98 U	1.98 U
Aroclor 1232	0.98 U	0.98 U	0.98 U
Aroclor 1242	0.98 U	0.98 U	0.98 U
Aroclor 1248	0.98 U	0.98 U	0.98 U
Aroclor 1254	0.98 U	0.98 U	0.98 U
Aroclor 1260	0.98 U	0.98 U	0.98 U
Pesticides (μg/L)			
4,4'-DDD	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U

GROUNDWATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS SEPTEMBER 1, 1998

	Sam	ple Designa	ation
Parameter	GW1	GW2	GW3
Aldrin	0.05 U	0.05 U	0.05 U
alpha-BHC	0.05 U	0.05 U	0.05 U
alpha-Chlordane	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.01 J	0.1 U
Endrin ketone	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.0026 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5 U

Key:

 μ g/L = Micrograms per liter.

NA = Not analyzed.

U = The analyte was analyzed for, but was Not detected above The reported sample quantitation limit.

J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

UJ = The analyte was Not detected above The reported sample quantitation limit. However, The reported quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Analytical Data Sources:

Inorganics:

Contract Laboratory Program, Incheape Testing Service and Environmental Laboratory,

Colchester, Vermont.

Organics:

Contract Laboratory Program, CompuChem Environmental Corporation, Cary, North Carolina.

SEDIMENT SAMPLES 2SED1 THROUGH 2SED7 ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

JUNE 2, 1999

			NE 2, 1999	mple Location			
Parameter	2SED1	2SED2	2SED3	2SED4	2SED5	2SED6	2SED7
Other							
Percent moisture	18	54	68	39	34	41	20
Metals (mg/kg)							
Arsenic, Total	8.9	104	83	39.7	27.3	9.4	4.9
Barium, Total	196	582	465	217	486	382	164
Cadmium, Total	4.4	8.9	4.4	2.1	4.7	6.6	3.6
Chromium, Total	333	366	157	66.9	157	537	173
Lead, Total	148	725	600	216	491	288	126
Mercury, Total	0.21	0.26	0.046 U	0.17	0.86	0.028 U	0.098
Selenium, Total	1.8	1.9	2.7	0.79 U	0.87 U	3.7	1.2
Silver, Total	0.29 B	0.72 B	1 B	0.53 B	0.17 B	0.94 B	0.41 B
Volatile Organic Compounds							
1,1,1-Trichloroethane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 U
1,1,2,2-Tetrachloroethane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 U
1,1,2-Trichloroethane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 U
1,1-Dichloroethane	6 U	10 U	14 U	8.1 U	1.6 J	8.4 U	5.9 U
1.1-Dichloroethene	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 U
1,2-Dichloroethane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 L
1,2-Dichloropropane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 L
2-Butanone	12 U	25	28 U	16 U	15 U	5.7 Ј	12 U
2-Chloroethylvinylether	12 U	21 U	28 U	16 U	15 U	17 U	12 U
2-Hexanone	12 U	21 U	28 U	16 U	15 U	17 U	12 U
4-Methyl-2-pentanone	12 U	21 U	28 U	16 U	15 U	17 U	12 U
Acetone	12 U	130	28 U	42	26	39	7.3
Benzene	6 U	2.2 Ј	14 U	8.1 U	52	8.4 U	5.9 U
Bromodichloromethane	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 U
Bromoform	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 ૉ
Bromomethane	12 U	21 U	28 U	16 U	15 U	17 U	12 U
Carbon disulfide	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 โ
Carbon tetrachloride	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 T
Chlorobenzene	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 t
Chloroethane	12 U	21 U	28 U	16 U	15 U	17 U	12 🖰
Chloroform	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.9 t
Chloromethane	12 U	21 U	28 U	16 U	15 U	17 U	12 U
cis-1,3-Dichloropropene	6 U	10 U	14 U	8.1 U	7.5 U	8.4 U	5.91
Dibromochloromethane	6 U	10 U	14 U	8.1 U			5.9 1
Ethylbenzene	6 U	10 U	14 U	8.1 U	7.5 U		5:91
Methylene chloride	6 U	10 U	14 U	8.1 U	7.5 U		5.9
Styrene	6 U	10 U	14 U	8.1 U	7.5 U		5.9
Tetrachloroethene	6 U	10 U	14 U	8.1 U	7.5 U		5.9
Toluene	6 U	10 U	14 U		7.5 U		5.9
trans-1,2-Dichloroethene	6 U	10 U	14 U	8.1 U	7.5 U		5.9
trans-1,3-Dichloropropene	6 U	10 U	14 U	8.1 U	7.5 U		5.9
Trichloroethene	6 U	10 U	14 U	8.1 U	7.5 U		5.9
Vinyl acetate	12 U	21 U	28 U	16 U	15 U	17_U	12
Vinyl chloride	12 U	21 U	28 U	16 U	15 U		12
Xylenes, total	6 U	10 U	14 U	8.1 U	2.1 J	8.4 U	5.9
Semivolatile Organic Compo							
1,2,4-Trichlorobenzene	390 U	710 U	1,000 U	1,600 U	490 U		370
1,2-Dichlorobenzene	390 U	710 U			490 U		370
1,3-Dichlorobenzene	390 U	710 U					
1,4-Dichlorobenzene	390 U				490 U	530 U	370

SEDIMENT SAMPLES 2SED1 THROUGH 2SED7 ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

JUNE 2, 1999

		- 00	NE 2, 1999 Sa	mple Locatio	n		
Parameter	2SED1	2SED2	2SED3	2SED4	2SED5	2SED6	2SED7
2,4,5-Trichlorophenol	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
2,4,6-Trichlorophenol	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2,4-Dichlorophenol	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2,4-Dimethylphenol	390 U	710 U	130 J	1,600 U	79 J	1,200	370 U
2,4-Dinitrophenol	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
2,4-Dinitrotoluene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2,6-Dinitrotoluene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2-Chloronaphthalene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2-Chlorophenol	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
2-Methylnaphthalene	210 Ј	380 Ј	2,600	1,100 J	250 J	660	83 J
2-Methylphenol	390 U	710 U	1,000 U	1,600 U	120 J	520 J	370 U
2-Nitroaniline	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
2-Nitrophenol	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
3,3'-Dichlorobenzidine	780 U	1,400 U	2,000 U	3,200 U	980 U	1,100 U	740 U
3-Nitroaniline	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
4,6-Dinitro-2-methylphenol	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
4-Bromophenyl-phenylether	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
4-Chloro-3-methylphenol	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
4-Chloroaniline	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
4-Chlorophenyl-phenylether	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
4-Methylphenol	120 J	100 J	180 J	1,600 U	210 J	640	81 J
4-Nitroaniline	980 U	1,800 U	2,600 U	4,000 U	220 Ј	1,300 U	930 U
4-Nitrophenol	980 U	1,800 U	2,600 U	4,000 U	1,200 U	1,300 U	930 U
Acenaphthene	390 U	710 U	120 J	1,600 U	74 J	68 J	370 U
Acenaphthylene	280 J	690 J	410 J	300 J	630	1,400	190 Ј
Anthracene	190 J	480 J	340 J	280 J	410 J	540	140 J
Benzo[a]anthracene	320 J	560 J	790 J	670 J	450 J	750	360 J
Benzo[a]pyrene	420	700 J	970 J	750 J	550	1,100	440
Benzo[b]fluoranthene	460	930	1,200	1,000 J	800	1,300	610
Benzo[g,h,i]perylene	380 J	510 J	520 J	380 J	450 J	740	280 J
Benzo[k]fluoranthene	470	730	1,100	870 J	790	1,400	500
Benzoic acid	210 J	230 J	640 J	380 J	1,300	2,700	390 J
Benzyl alcohol	390 U	710 U	1,000 U	1,600 U	250 J	210 Ј	370 U
Bis(2-chloroethoxy)methane	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Bis(2-chloroethyl)ether	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Bis(2-chloroisopropyl)ether	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Bis(2-ethylhexyl)phthalate	810	1,700	4,100	8,400	6,800 E	4,400 E	600
Butylbenzylphthalate	210 J	340 J	3,500	1,400 J	4,300 E	1,700	110 J
Chrysene	430	820	1,100	880 J	650	930	470
Di-n-butylphthalate	120 J	150 J	440 J	200 J	370 J	1,200	64 Ј
Di-n-octylphthalate	390 U	710 U	160 J	280 Ј	180 J	140 J	370 U
Dibenz[a,h]anthracene	110 J	200 J	240 J	170 J	170 J	250 J	99 J
Dibenzofuran	390 U	79 J	110 J	1,600 U	62 J	140 J	370 U
Diethylphthalate	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Dimethylphthalate	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Fluoranthene	960	1,900	3,100	2,200	1,600	3,200	1,100
Fluorene	390 U	95 J	220 J	1,600 U	82 J	130 J	370 U
Hexachlorobenzene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Hexachlorobutadiene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Hexachlorocyclopentadiene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U
Hexachloroethane			230 J	240 J	210 J	350 J	210
Indeno[1,2,3-cd]pyrene	280 J	330 J	230 J	240 J	∠10 J	330 1	210.

SEDIMENT SAMPLES 2SED1 THROUGH 2SED7 ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

JUNE 2, 1999

		Sample Location						
Parameter	2SED1	2SED2	2SED3	2SED4	2SED5	2SED6	2SED7	
Isophorone	550	920	10,000 E	5,600	310 J	650	59 J	
N-Nitroso-di-n-propylamine	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U	
N-Nitrosodiphenylamine	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U	
Naphthalene	190 Ј	370 J	1,900	860 J	240 J	720	76 J	
Nitrobenzene	390 U	710 U	1,000 U	1,600 U	490 U	530 U	370 U	
Pentachlorophenol	980 U	1,800 U	330 J	1,800 J	3,100	1,300 U	930 U	
Phenanthrene	370 J	750	1,200	810 J	550	830	320 J	
Phenol	390 U	110 J	810 J	1,600 U	140 J	610	370 U	
Pyrene	330 J	690 J	1,500	960 J	700	860	420	
Polychlorinated Biphenyls (µ	g/kg)							
Aroclor 1016	21 U	37 U	53 U	28 U	26 U	29 U	21 U	
Aroclor 1221	40 U	72 U	100 U	54 U	50 U	56 U	41 U	
Aroclor 1232	21 U	37 U	53 U	28 U	26 U	29 U	21 U	
Aroclor 1242	93	190	150	240	1,000	220	120	
Aroclor 1248	21 U	37 U	53 U	28 U	26 U	29 U	21 U	
Aroclor 1254	150	200	140	170	440	330	210	
Aroclor 1260	70	85	71	71	180	140	88	
Pesticides (μg/kg)								
4,4'-DDD	16	20 J	31 Ј	16 U	47	29	26	
4,4'-DDE	3.2 J	3.3 J	31 U	16 U	11 J	17 U	19	
4,4'-DDT	12 U	22 U	31 U	16 U	30 U	17 U	13	
Aldrin	6.1 U	11 U	16 U	8.2 U	8.9 J	8.5 U	6.2 U	
alpha-BHC	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 U	
alpha-Chlordane	18	11	16 U	8.2 J	110	28	6.2 U	
beta-BHC	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 U	
delta-BHC	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 U	
Dieldrin	7 J	22 U	31 U	2.9 J	34	19	12 U	
Endosulfan I	12 U	22 U	31 U	16 U	30 U	17 U	12 U	
Endosulfan II	12 U	22 U	31 U	16 U	30 U	17 U	12 U	
Endosulfan sulfate	12 U	22 U	31 U	16 U	30 U	17 U	12 U	
Endrin	12 U	22 U	31 U	16 U	30 U	17 U	12 U	
Endrin aldehyde	12 U	22 U	31 U	16 U	30 U	17 U	12 U	
gamma-BHC (Lindane)	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 L	
gamma-Chlordane	8.1	4 J	16 U	3.6 J	54	3.8 J	1.6.	
Heptachlor	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 ኒ	
Heptachlor epoxide	6.1 U	11 U	16 U	8.2 U	15 U	8.5 U	6.2 U	
Methoxychlor	61 U	110 U	160 U	82 U	150 U	85 U	62 U	
Toxaphene	300 U	540 U	780 U	410 U	760 U	420 U	310 L	

Key:

mg/kg = Milligrams per kilogram. $\mu g/kg = Micrograms per kilogram.$

U = Not detected.

J = Estimated value.

B = Also detected in blank.

E = Value used is from diluted sample. Original value exceeded calibration range.

Analytical Data Source: Ecology & Environment, Inc. Analytical Services, Lancaster, New York.

SEDIMENT SAMPLES 2SED1 THROUGH 2SED7 TCLP ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS JUNE 2, 1999

Units - mg/L

		Sample Location									
Parameter	Regulatory Limit	2SED1	2SED2	2SED3	2SED4	2SED5	2SED6	2SED7			
Arsenic	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			
Barium	. 100	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
Cadmium	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U			
Chromium	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			
Lead	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			
Mercury	0.2	0.21	0.26	0.046 U	0.17	0.86	0.028 U	0.098			
Selenium	1	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			
Silver	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			

Key:

TCLP = Toxicity Characteristic Leaching Procedure.

mg/L = Milligrams per liter.

U = Not detected.

Note: Bolded concentrations exceed the regulatory limit defined in Title 40 of the Code of Federal Regulations, Section 261.24.

Analytical Data Source: Ecology & Environment, Inc. Analytical Services, Lancaster, New York.

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 12, 1999

	MAY 12, 19	999	410-			
		Sample Lo	Sample Location W2 AW3			
Parameter	AW1	AW2	AWS	AW4		
ther			8	7.9		
H (Standard units)	7.8	8.1				
Metals (μg/L)		105.70	38.2 U	38.2 U		
luminum, Dissolved	222	105 B	268	702		
luminum, Total	594	275	42.6 U	42.6 U		
antimony, Dissolved	42.6 U	42.6 U	42.6 U	42.6 U		
antimony, Total	42.6 U	42.6 U	2.1 U	8.2 E		
Arsenic, Dissolved	33	12.3	2.1 U	11.5		
Arsenic, Total	44.7	18.6	38.1 B	36 F		
Barium, Dissolved	285	234	49.3 B	52.6 I		
Barium, Total	358	244	0.33 U	0.36 I		
Beryllium, Dissolved	0.33 U	0.33 U	0.33 U	0.33 T		
Beryllium, Total	0.33 U	0.33 U	4.4 U	4.4 \		
Cadmium, Dissolved	4.4 U	4.4 U	4.4 U	4.4 \		
Cadmium, Total	4.4 U	4.4 U	86,000	116,00		
Calcium, Dissolved	134,000	110,000	89,300	123,00		
Calcium, Total	140,000	110,000	5.7 U	5.7		
Chromium, Dissolved	8 B	5.9 B	7.1 B	5.7		
Chromium, Total	23.2	5.7 U	23.1 U	23.1		
Cobalt, Dissolved	23.1 U	23.1 U	23.1 U	23.1		
Cobalt, Total	23.1 U	23.1 U	11.8 B	4.7		
Copper, Dissolved	5.9 B			4.7		
Copper, Total	33		7.1 B	54.2		
Iron, Dissolved	523		679	1,09		
Iron, Total	6,580		2.1 U	2.1		
Lead, Dissolved	2.1 U		22.5	6		
Lead, Total	107		34,700	41,10		
Magnesium, Dissolved	72,400			42,3		
Magnesium, Total	72,300		35,300	1		
Manganese, Dissolved	2,460		98.5	3		
Manganese, Total	2,790		316	0.1		
Mercury, Dissolved	0.1 \		0.1 U	0.1		
Mercury, Total	0.1		0.1 U	27		
Nickel, Dissolved	30 1		27 U	27		
Nickel, Total	27 (J 27 U	27 U			
Potassium, Dissolved	65,50			18,6 20,7		
Potassium, Total	67,00					
Selenium, Dissolved	2			2.		
Selenium, Total	2.3			2		
Silver, Dissolved	5.4			5.4		
Silver, Total	5.4			5.4		
Sodium, Dissolved	168,00	221,000		41,		
Sodium, Dissolved Sodium, Total	171,00	208,000				
Thallium, Dissolved	1.9		1.9 U	1.		
	1.9					
Thallium, Total	5.1					
Vanadium, Dissolved	15.6		J 5.1 U			
Vanadium, Total	10.1			10.		
Zinc, Dissolved Zinc, Total		9 29.:				

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 12, 1999

		Sample L		
Parameter	AW1	AW2	AW3	AW4
Volatile Organic Compounds (µ	g/L)			
1,1,1-Trichloroethane	64	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	50 U	10 U	10 U	10 U
1,1,2-Trichloroethane	50 U	10 U	10 U	10 U
1,1-Dichloroethane	36 J	10 U	10 U	10 U
1,1-Dichloroethene	50 U	10 U	10 U	10 U
1,2-Dichloroethane	39 J	10 U	10 U	10 U
1.2-Dichloroethene, total	100	10 U	10 U	10 U
1,2-Dichloropropane	50 U	10 U	10 U	10 U
2-Butanone	860	10 U	10 U	10 U
2-Hexanone	50 U	10 U	10 U	10 U
4-Methyl-2-pentanone	480	12	10 U	10 U
Acetone	520	10 U	10 U	10 U
Benzene	17 J	10 U	10 U	10 U
Bromodichloromethane	50 U	10 U	10 U	10 U
Bromoform	50 U	10 U	10 U	10 U
Bromomethane	50 U	10 U	10 U	10 U
Carbon disulfide	50 U	10 U	10 U	10 U
Carbon tetrachloride	50 U	10 U	10 U	10 U
Chlorobenzene	22 J	2 Ј	1 J	2 J
Chloroethane	50 U	10 U	10 U	. 10 U
Chloroform	10 Ј	10 U	10 U	10 U
Chloromethane	50 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	50 U	10 U	10 U	10 U
Dibromochloromethane	50 U	10 U	10 U	10 U
Ethylbenzene	210	10 U	10 U	10 U
Methylene chloride	150	19	16	17
Styrene	50 U	10 U	10 U	10 U
Tetrachloroethene	16 J	10 U	10 U	10 U
Toluene	550	10 U	10 U	10 U
trans-1,3-Dichloropropene	50 U	10 U	10 U	10 U
Trichloroethene	180	10 U	10 U	10 U
Vinyl chloride	50 U	10 U	10 U	10 U
Xylenes, total	440	3 J	2 J	10 U
Semivolatile Organic Compound	s (μg/L)			
1,2,4-Trichlorobenzene	100 U	10 U	10 U	10 U
1,2-Dichlorobenzene	100 U	10 U	10 U	10 U
1,3-Dichlorobenzene	100 U	10 U	10 U	10 U
1,4-Dichlorobenzene	100 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	250 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	100 U	10 U	10 U	10 U
2,4-Dichlorophenol	100 U	10 U	10 U	10 U
2,4-Dimethylphenol	100 U	10 U	10 U	10 U
2,4-Dinitrophenol	250 U	25 U	25 U	25 U
2,4-Dinitrotoluene	100 U	10 U	10 U	10 U
2,6-Dinitrotoluene	100 U	10 U	10 U	10 U
2-Chloronaphthalene	100 U	10 U	10 U	10 U
2-Chlorophenol	100 U	10 U	10 U	10 U
2-Methylnaphthalene	100 U	10 U	10 U	10 L

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 12, 1999

		Sample 1		
Parameter	AW1	AW2	AW3	AW4
2-Methylphenol	100 U	10 U	10 U	10 U
2-Nitroaniline	250 U	25 U	25 U	25 U
2-Nitrophenol	100 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	100 U	10 U	10 U	10 U
3-Nitroaniline	250 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	250 U	25 U	25 U	25 U
4-Bromophenyl-phenylether	100 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	100 U	10 U	10 U	10 U
4-Chloroaniline	100 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	100 U	10 U	10 U	10 U
4-Methylphenol	38 Ј	10 U	10 U	10 U
4-Nitroaniline	250 U	25 U	25 U	25 U
4-Nitrophenol	250 U	25 U	25 U	25 U
Acenaphthene	100 U	10 U	10 U	10 U
Acenaphthylene	100 U	10 U	10 U	10 U
Anthracene	100 U	10 U	10 U	10 U
Benzo[a]anthracene	100 U	10 U	10 U	10 U
Benzo[a]pyrene	100 U	10 U	10 U	10 U
Benzo[b]fluoranthene	100 U	10 U	10 U	10 U
Benzo[g,h,i]perylene	100 U	10 U	10 U	10 U
Benzo[k]fluoranthene	100 U	. 10 U	10 U	10 U
Bis(2-chloroethoxy)methane	100 U	10 U	10 U	10 U
Bis(2-chloroethyl)ether	700	29	10 U	10 U
Bis(2-chloroisopropyl)ether	100 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	100 U	30 U	10 U	10 U
Butylbenzylphthalate	100 U	0.8 Ј	0.8 J	10 U
Carbazole	100 U	10 U	10 U	10 U
Chrysene	100 U	10 U	10 U	10 U
Di-n-butylphthalate	100 U	0.8 J	1 J	1 J
Di-n-octylphthalate	100 U	10 U	10 U	10 U
Dibenz[a,h]anthracene	100 U	10 U	10 U	10 U
Dibenzofuran	100 U	10 U	10 U	10 U
Diethylphthalate	100 U	10 U	10 U	10 U
Dimethylphthalate	7 J	10 U	10 U	10 U
Fluoranthene	100 U	10 U	10 U	10 U
Fluorene	100 U	10 U	10 U	10 U
Hexachlorobenzene	100 U	10 U	10 U	10 U
Hexachlorobutadiene	100 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	100 U	10 U	10 U	10 U
Hexachloroethane	100 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	100 U	10 U	10 U	10 U
Isophorone	220	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	100 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	100 U	10 U	10 U	10 U
Naphthalene	7 J	10 U	10 U	10 U
Nitrobenzene	100 U	10 U	10 U	10 U
Pentachlorophenol	250 U	25 U	25 U	25 U
Phenanthrene	100 U	10 U	10 U	10 U
Phenol	100 U	10 U	10 U	10 U

SURFACE WATER ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 12, 1999

		Sample 1	Location	
Parameter	AW1	AW2	AW3	AW4
Pyrene	100 U	10 U	10 U	10 U
Polychlorinated Biphenyls (μg/L)				
Aroclor 1016	1 U	1 U	1 U	1 U
Aroclor 1221	2 U	2 U	2 U	2 U
Aroclor 1232	1 U	1 U	1 U	1 U
Aroclor 1242	1 U	1 U	1 U	1 U
Aroclor 1248	1 U	1 U	1 U	1 U
Aroclor 1254	1 U	1 U	1 U	1 <u>U</u>
Aroclor 1260	1 U	1 U	1 U	1 U
Pesticides (μg/L)				
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 <u>U</u>	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U
alpha-Chlordane	0.22	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 P	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.065 P	0.05 U	0.05 U	0.05 U
Heptachlor	0.29 P	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5 U	5 U

Key:

μg/L	=	Micrograms per liter.
U	=	The analyte was analyzed for, but was not detected above
		the level of the associated value. The associated value is
		either the sample quantification limit or sample detection limit.
J	==	The associated value is an estimate quantity.
В	=	The associated value is between the instrument detection limit and
		the contract required detection limit.
UJ	==	The analyte was analyzed for, but was not detected. The
		associated value is an estimate and may be inaccurate or imprecise.
P	=	Indicates a pesticide/Arochlor target analyte when there is greater than
		25% difference for the detected concentrations between two GC
		columns. The lower of the two results is reported.

Analytical Data Sources:

Inorganics:

Datachem Laboratories, Inc., Salt Lake City, Utah.

Organics:

Southwest Laboratory of Oklahoma, Broken Arrow, Oklahoma.

GROUNDWATER FIELD DATA LAKE CALUMET CLUSTER SITE

CHICAGO, ILLINOIS

								CILC	igu, illin	1019									
										Sample Do	esignation								
		G-21S	LC-01	LC-02	LC-03	LC-04	LC-05	LC-06	LC-07	LC-09	LC-10	LC-11	LC-12	LC-13	P-01	P-02	P-03	P-04	T D OF
	Sample Date	5/10/99	5/10/09	5/10/99	5/10/99	5/11/99	5/10/99	5/11/99	5/11/99	5/11/99	5/11/99	5/11/99	5/11/99						P-05
	Sample Time	1425	1255	1315	1400	900	1130	925	1310	1115	1120	1145		5/11/99	5/12/99	5/12/99	5/12/99	5/12/99	5/11/99
Parameter	Units							720	1310	1113	1120	1145	1130	1435	1205	1115	1100	1155	1312
Temperature	o _E	12 10	14.50	\m_	10.50													<u> </u>	
		13.18	14.59	NR	12.53	11.7	11.56	11.7	12.6	13.65	13.45	11.5	10.96	14.89	12.05	NR	14.17	14.13	12.81
	mg/L	7.42	5.48	NR		3.58	3.03	1.56	2.67	2.89	3.41	5.2	2,72				2.14	2.23	
Specific Conductivity	μohms	2,352	13,302	NR	2,465	1,959	2,690	4,692	3,655	6,503	7,927								
	Standard Units	7.04	5.72	NR	7.18	6.72	8.89	7.08	6.34	6.53	6,63	6.86							4
Depth to Water	Feet	4.92	6.38	NR	3.1	3.52	10.09	2.54					7.37		7.12		7.27	6.64	
PID Reading	ppm	0	0	NR	NR	NR	10.09		2.56	3.8	3.71	4.61	3.46	2.45	2.5		4.64	2.54	3.25
FID Reading	ppm	0	1,000	NR			- 0	NR	NR	NR	NR	NR	NR	NR NR	NR	NR	NR	NR	NR
ORP	eV	400				50	0	>1,000	>1,000	>1,000	>1,000	600	>1,000	>1,000	NR	NR	NR	NŔ	
OVA Reading		409	202	NR	2.89	521	NR	311	239	380	261	213	220	248	301				
OVA REAUTING	ppm	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0	300	800		NR
													1110	1110	<u> </u>	300	000	U	INI

Key:

=	Degree farenheit.
=	Milligrams per liter.
=	Microohms.
=	Photoionization detector.
=	Parts per million.
==	Flame ionization detector.
=	Oxidation-reduction potential.
=	Organic vapor analyzer.
=	Electronvolts.
=	Not reported.
	= = = =

Note: Depth to water is measured from the top of the inner casing of the groundwater well.

Source: Ecology & Environment, Inc. Site logbook.

GROUNDWATER SAMPLES ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 10-12, 1999

								WIA 1 10-12	Sample L	ocation								
Parameter	G21S	LC01	LC02	LC03	LC04	LC05	LC06	LC07	LC09	LC10	LC11	LC12	LC13	P01	P02	P03	P04	P05
Other																		
pH (Standard units)	7.4	6	6.9	7.4	7	8.7	7.1	6.6	6.9	6.6	7.2	7	6.9	7.5	7.2	7.2	7	7
Metals (μg/L)																		
Aluminum, Dissolved	38.2 U	401	38.2 U	38.2 U	38.2 U	59.8 J	38.2 U	38.2 U	53.2 B	149 B	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U
Aluminum, Total	828 J	8,010 J	36,000 J	16,800 J	10,500	30,000 J	45,300	46,600 U	37,200	25,300	5,850	17,800	39,300	10,000	50,500	314	25,500	1,250 U
Antimony, Dissolved	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U
Antimony, Total	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	160	64.1 B	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U	42.6 U
Arsenic, Dissolved	2.1 U	52.8 UJ	2.1 U	2.1 U	2.1 U	4.7	3.5 B	13.6	3 B	2.1 U	2.1 U	2.1 U	2.1 U	7.1 B	9.5 B	5.8 B	3.6 B	18
Arsenic, Total	2.1 U	52.8 UJ	7.5	9.6	10.1 B	25.3	52	122	34.8	42.3	2.1 U	10.1 B	72.7	26.3	37	5.9 B	26.2	22.9
Barium, Dissolved	908	114	463	370	109 B	187	237	722	125 B	169 B	277	124 B	136 B	624	1,250	255	3,220	283
Barium, Total	942	375	621	993	235	1,090	2,530	2,980	1,050	1,400	333	316	1,460	1,160	2,160	248	4,650	440
Beryllium, Dissolved	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.57 J	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Beryllium, Total	0.33 U	0.33 U	1.1 J	0.33 UJ	1.1 B	0.65 J	5 B	6.3	3.1 B	2.1 B	0.77 B	1.4 B	3.2 B	1.4 B	2.9 B	0.33 U	1.9 B	0.33 U
Cadmium, Dissolved	4.4 U	5.6 J	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	8.5
Cadmium, Total	4.4 U	8 J	4.4 U	4.5 J	8.5	5.7 J	11	20.7	18.2	21.9	4.4 U	4.4 U	148	4.4 U	9.9	4.4 U	4.4 U	4.4 U
Calcium, Dissolved	153,000	850,000	373,000	161,000	146,000	84,100	53,900	193,000	41,500	67,500	169,000	14,700	75,900	86,100	104,000	211,000	200,000	164,000
Calcium, Total	159,000	788,000	416,000	242,000	183,000	230,000	313,000	315,000	159,000	104,000	182,000	241,000	127,000	120,000	261,000	212,000	288,000	178,000
Chromium, Dissolved	5.7 U	70.2	7.1 J	5.7 U	5.7 U	5.7 U	5.7 U	6.8 B	13.9	16.3	5.7 U	5.7 U	5.7 U	23.2	10.6 B	16.3	6.1 B	10.4 F
Chromium, Total	5.7 U	341	57.7	71.2	51.2	288	150	268	352	352	16.5	64.4	299	77.5	160	14	62.6	17.2
Cobalt, Dissolved	23.1 U	77.2	23.9	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U	24.4 B	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U	23.1 U
Cobalt, Total	23.1 U	76.9	31	23.1 U	23.1 U	25.8	35.2 B	30 B	40.9 B	38.3 B	23.1 U	23.1 U	33.4 B	23.1 U	45 B	23.1 U	26.4 B	23.1 U
Copper, Dissolved	4.4	4.8	3.8 U	3.8 U	4.6 B	3.8 U	3.8 U	3.8 U	14.8 B	13.7 B	3.8 U	3.8 U	4.5 B	4.7 B		5.9 B	3.8 U	5.7 I
Copper, Total	3.8 J	191 J	56.7 J	147 J	145	320 J	331	1,170	426	529	9 B	606	894	155		3.8 U	66.3	3.8 U
Iron, Dissolved	527	1,420,000	6,960	9,690	101 B	123	711	41,000	1,830	2,600	189	615	6,530	888	900	217	2,440	1,470
Iron, Total	6,830	1,370,000	42,900	70,600	35,700	88,700	114,000	217,000	172,000	151,000	9,080	48,200	226,000	57,000	105,000	1,610	64,900	18,900
Lead, Dissolved	2.1 U	19.5	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.8 B	10.8	2.1 U	2.1 U	2.8 B	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Lead, Total	5	261	64.5	364	154	1,320	2,720	3,110	2,100	1,480	13.5	320	2,180	740	422	2.1 U	594	
Magnesium, Dissolved	93,200	456,000	214,000	95,500	43,000	45,300	120,000	118,000	77,900	75,700	97,300	88,000	80,900	104,000	125,000	146,000	163,000	76,200
Magnesium, Total	95,800	429,000	220,000	113,000	50,300	83,700	179,000	139,000	120,000	82,500	103,000	108,000	91,200	111,000	163,000	145,000	199,000	
Manganese, Dissolved	140 J	13,700 J	916 J	312 J	627	434 J	170	1,790	65.8	107	67.8	173	380	409		347	506	
Manganese, Total	179	12,700	1,430	1,400	1,010	8,520	3,560	4,070	1,460	902	173	625	2,290	1,520	2,250	359	1,530	
Mercury, Dissolved	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Mercury, Total	0.1 UJ	0.44 J	0.1 UJ	1.1 J	0.35	0.1 UJ	2.8	3.6 U	1	3.6	0.1 U	0.76	9.3	1.2	0.82	0.1 U	0.41	
Nickel, Dissolved	27 U	2,020	119 J	27 U	27 U	27 U	27 U	27 U	37.4 B	37.4 B	27 U	28.1 B	27 U	53.1	53.1	27 U	27 U	37.5 I
Nickel, Total	27 U	1,860	170 J	57.7 J	32 B	48 J	105	216	151	133	32.6 B	111	248	75.1	106	27 U	37.9	
Potassium, Dissolved	46,900	392,000	26,200	54,500	43,500	88,000	148,000	95,400	278,000	213,000	72,700	77,700	64,400	236,000	227,000	207,000	175,000	
Potassium, Total	47,900	352,000	37,600	57,500	50,800	97,900	170,000	118,000	296,000	214,000	79,300	92,200	74,300	240,000	249,000	202,000	186,000	
Selenium, Dissolved	4.3 J	2 U	3.4 J	2 U	3.9 B	2.9 J	2.5 B	8	4.3 B	6.2	3.4 B	3.7 B	4.7 B	2.7 B	2.3 B	2 U	2 B	
Selenium, Total	2 U	14.4	7.1 J	5.5 J	2 U	6.5 J	8.8	22.9	10.1	8.4	4.5 B	11.4	17.3	3.3 B	7.5	2.8 B	2.8 B	
Silver, Dissolved	5.4 U	18.1	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	
Silver, Total	5.4 U	17.6	5.4 U	5.4 U	5.8 B	5.4 U	15.1	17.7	12.1	14	5.7 B	5.5 B	20.7	5.4 B	5.4 U	5.4 U	5.4 U	
Sodium, Dissolved	184,000	1,430,000	462,000	199,000	121,000	338,000	453,000	279,000	1,010,000	727,000	262,000	232,000	272,000	551,000	2,280,000	912,000	421,000	
Sodium, Total	187,000	1,350,000	404,000	203,000	131,000	356,000	485,000	320,000	105,000	791,000	273,000	259,000	293,000	554,000	2,390,000	877,000	428,000	
Thallium, Dissolved	1.9 U	45.3 J	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2.9 B	3.2 B	1.9 U	
Thallium, Total	1.9 U	16.3 J	1.9 U	1.9 U	1.9 U	9.4 U	1.9 U	3.8 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2.6 B	1.9 U	
Vanadium, Dissolved	6.1	77.7	5.1 U	6.9	5.1 U	38.9	5.1 B	6.9 B	5.1 U	5.1 U	5.2 B	5.1 U	5.1 U	5.7 B	5.1 U	8.9 B	5.1 U	
Vanadium, Total	7.2	74.3	69.9	37.3	20.1 B	192	107	254	83.3	53.9 B	18.5 B	41.2 B	97.7	36.7 B	95	9.8 B	65	
Zinc, Dissolved	10.1 U	51,600	17.3	13.2	10.1 U	10.1 U	10.1 U	22.8	10.1 U	44.5	10.1 U	10.1 U	10.1 U	10.1 U	10.1 U	10.1 U	10.1 U	10.1 U
Zinc, Total	20.7	47,900	184	1,630	1,340	1,280	2,140	6,940	4,940	5,030	406	798	10,200	756	2,080	10.1 U	470	17.9 I

GROUNDWATER SAMPLES ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 10-12, 1999

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						T	·····		Sample L									
Parameter	G21S	LC01	LC02	LC03	LC04	LC05	LC06	LC07	LC09	LC10	LC11	LC12	LC13	P01	P02	P03	P04	P05
Volatile Organic Compound																		
1,1,1-Trichloroethane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U		10 U	10 U			10 U		10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U		10 U	10 U			10 U	100 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U		10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	1,400	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
1,2-Dichloroethene, total	10 U	750	3 J	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
2-Butanone	10 U	3,600	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U		10 U	10 U		10 U	10 U	10 U
2-Hexanone	10 U	100 U	10 UJ	10 U	10 UJ		10 UJ	2,000 UJ		10 UJ	10 UJ			10 UJ		10 UJ	10 UJ	10 U
4-Methyl-2-pentanone	10 UJ	390 J	10 UJ	10 UJ	10 UJ		10 UJ	2,000 UJ	10 UJ	10 UJ	10 UJ	25 UJ		10 U	310	10 U	10 U	10 U.
Acetone	10 U	5,000	10 U	10 U	10 U		10 U	2,000 U	32	27 J	10 U		23 J	19 J		24	10 U	19
Benzene	21	73 J	10 U	9 J	1 J		26 J	2,400 J	6 J	7 J	27 J		52 J	55 J	95 J	14	68	
Bromodichloromethane	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
Bromoform	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U		10 U	10 U	100 U	10 U	10 U	10 U
Bromomethane	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Carbon disulfide	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Carbon tetrachloride	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Chlorobenzene	13	100 U	10 U	3 J	62 J	10 U	9 J	2,000 U	10 U	6 J	2 J		8 J	6 J	170	3 J	7 J	
Chloroethane	10 U	190	10 U	20 J	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	8 J	10 U	100 U	10 U	10 U	10 U
Chloroform	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Chloromethane	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Dibromochloromethane	10 U	100 U	10 U	10 U	10 U		10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Ethylbenzene	10 U	240	10 U	10 U	10 U		10 U	5,800 J	81	11 J	10 U	8 J	7 J	1 J	550	10 U	10 U	7.
Methylene chloride	10 U	22,000	10 UJ	10 U	10 UJ	10 U	10 UJ	2,000 UJ	10 UJ	10 UJ	10 UJ	25 UJ	10 UJ	13 J	170 J	17 J	19 J	10 U.
Styrene Tetrachloroethene	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	2.
	10 U	130	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Toluene	1 J	3,700	10 U	10 U	10 U	10 U	10 U	38,000 J	7 J	7 J	10 U	3 J	13 J	2 J	1,600	10 U	10 U	10 U
trans-1,3-Dichloropropene Trichloroethene	10 U	100 U	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Vinyl chloride	10 U	270	10 U	10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 Ú	10 U
Xylenes, total	10 U 10 U	84 J 960	10 U 2 J	10 U 10 U	10 U	10 U	10 U	2,000 U	10 U	10 U	10 U	25 U	10 U	10 U	100 U	10 U	10 U	10 U
Semivolatile Organic Compo		900[2.3]	10 0	1 J	10 U	6 J	18,000 J	360	63 J	10 U	5 J	72 J	12 J	3,100	10 U	10 U	4.
		1 000 11	10.11	10.17	10.77	10.11	10.77	100 717	10.11	40 77	40.55	40.77	40 777	40 71				
1,2,4-Trichlorobenzene 1,2-Dichlorobenzene	10 U 10 U	1,000 U	10 U	10 U 10 U	10 U 10 U	10 U	10 U	100 UJ	10 U	10 U	10 U		10 UJ	10 U	10 U	10 U	10 U	
1,3-Dichlorobenzene	10 U	1,000 U	10 U	10 U	10 U	11 10 U	0.9 J	7 J	0.6 J	1 J	10 U	10 U	2 J	1 J	7 J	10 U	10 U	10 U
1,4-Dichlorobenzene	0.6 J	1,000 U	10 U	0.6 J	4 J		10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 L
2,4,5-Trichlorophenol				25 U			1 J	100 UJ	1 J	3 J	0.6 J	3 J	2 J	1 J	6 J	10 U	10 U	10 U
2,4,6-Trichlorophenol	25 U 10 U	2,500 U	25 U 10 U	10 U	25 U		25 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 F
2,4-Dichlorophenol		1,000 U	10 U		10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 R
2,4-Dimethylphenol	10 U	1,000 U		10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	7 J	10 U	10 U	10 R
2,4-Dinitrophenol	10 U	1,000 U	10 U 25 U	10 U	10 U	10 U	10 U	320	21	10	10 U	3 J	10 U	10 U	94	10 U	10 U	10 F
2,4-Dinitrophenoi	25 U	2,500 U		25 U	25 U	25 U	25 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 F
	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene 2-Chloronaphthalene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 F
2-Methylnaphthalene	10 U	1,000 U	10 U	2 J	0.8 J	10 U	22	70 J	4 J	16	10 U	4 J	3 J	10 U	13	10 U	10 U	10 U

GROUNDWATER SAMPLES ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 10-12, 1999

								MAY 10-12										
Parameter	G21S	LC01	LC02	LC03	LC04	LC05	LC06	LC07	Sample L LC09		LC11	T C12	T C12	D01	TD02	D02	P04	P05
2-Methylphenol	10 U	370 J	10 U	10 U	10 U	10 U	10 U			LC10		LC12	LC13	P01	P02	P03		
2-Nitroaniline	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	100 U 250 UJ	0.7 J 25 U	0.6 J 25 U	10 U 25 U	0.8 J	10 U	10 U	66 25 II	10 U	10 U 25 U	10 I 25 U
2-Nitrophenol	10 U	1,000 U	10 U	10 U	10 U	11	10 U	230 UJ	10 U	10 U	10 U	25 U 10 U	25 UJ	25 U 10 U	25 U	25 U 10 U	10 U	10 I
3.3'-Dichlorobenzidine	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 U 10 UJ	10 U	10 U 10 U		10 U	10 (
3-Nitroaniline	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	250 UJ	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	10 U 25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 1
4-Bromophenyl-phenylether	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 t
4-Chloro-3-methylphenol	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 E
4-Chloroaniline	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 [
4-Chlorophenyl-phenylether	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 t
4-Methylphenol	10 U	3,000	10 U	1 J	1 J	10 U	5 J	100 U	12	9 J	10 U	7 J	10 03	10 U	370	10 U	10 U	10 E
4-Nitroaniline	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	250 UJ	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 I
Acenaphthene	10 U	1,000 U	10 U	5 J	10 U	0.5 J	1 J	250 U	10 U	4 J	10 U	23 U	0.7 J	1 J	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	1,000 U	10 U	0.6 J	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	0.9 J	10 U	10 U	10 U	10 t
Anthracene	10 U	1,000 U	10 U	2 J	10 U	1 J	1 J	100 UJ	10 U	7 J	10 U	2 J	0.7 J	3 J	10 U	1 J	10 U	1.
Benzo[a]anthracene	10 U	1,000 U	2 J	2 J	10 U	0.7 J	2 J	100 UJ	10 U	8 J	10 U	2 J	2 J	3 J	10 U	10 U	10 U	10 [
Benzo[a]pyrene	10 U	1,000 U	2 J	2 J	10 U	0.5 J	2 J	100 UJ	10 U	81	10 U	2 J	2 J	3 J	10 UJ	10 UJ	10 U	10 U.
Benzo[b]fluoranthene	10 U	1,000 U	3 J	2 J	10 U	10 U	2 J	100 UJ	10 U	10 J	10 U	2 J	2 J	2 J	10 UJ	10 UJ	10 U	10 U.
Benzo[g,h,i]perylene	10 U	1,000 U	2 J	0.8 J	10 U	10 U	10 U	100 UJ	10 U	1 J	10 U	10 U	0.8 J	0.6 J	10 UJ	10 UJ	10 U	10 U.
Benzo[k]fluoranthene	10 U	1,000 U	2 J	2 J	10 U	10 U	1 J	100 UJ	10 U	9 J	10 U	1 J	1 J	3 J	10 UJ	10 UJ	10 U	10 U.
Bis(2-chloroethoxy)methane	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl)ether	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	260 J	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	23
Bis(2-chloroisopropyl)ether	10 U	1,000 U	· 10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	10 U	1,000 U	10 U	10 U	10 U	10 U	17 U	170 UJ	10 U	79	10 U	10 U	42 J	10 U	11 U	10 U	10 U	10 L
Butylbenzylphthalate	10 U	1,000 U	10 J	10 U	10 U	10 U	10 U	15 J	10 U	10 U	10 U	10 U	10 UJ	0.6 J	10 U	10 U	10 U	10 U
Carbazole	10 U	1,000 U	10 U	3 J	10 U	0.7 U	2 J	8 J	10 U	91	10 U	2 J	0.6 J	1 J	10 U	10 U	0.8 J	10 U
Chrysene	10 U	1,000 U	3 J	2 J	10 U	0.7 J	2 J	100 UJ	10 U	8 J	10 U	2 J	2 J	3 J	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	1,000 U	0.9 U	1 J	1 J	1 J	0.6 J	14 J	1 J	1 J	0.6 J	10 U	0.9 J	1 J	3 J	0.9 J	1 J	0.5
Di-n-octylphthalate	10 U	1,000 U	10 U	10 U	10 U	10 U	0.5 J	100 UJ	10 U	3 J	10 U	10 U	0.8 J	10 UJ	10 UJ	10 UJ	10 UJ	10 U.
Dibenz[a,h]anthracene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	0.8 J	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U.
Dibenzofuran	10 U	1,000 U	10 U	2 J	10 U	10 U	1 J	8 J	10 U	3 J	10 U	1 J	10 UJ	1 J	10 U	10 U	10 U	10 U
Diethylphthalate	0.5 J	230 J	0.5 J	0.7 J	0.6 J	0.6 J	2 J	20 J	5 J	5 J	10 U	0.6 J	2 J	10 U	10 U	10 U	10 U	1.
Dimethylphthalate	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	1,000 U	5 J	4 J	0.5 J	2 J	4 J	91	10 U	21	10 U	5 J	1 J	10	0.8 J	10 U	10 U	10 U
Fluorene	10 U	1,000 U	10 U	3 J	10 U	0.7 J	2 J	12 J	10 U	6 J	10 U	2 J	0.8 J	3 J	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	10 U	1,000 U	2 J	1 J	10 U	10 U	0.6 J	100 UJ	10 U	2 J	10 U	0.7 J	0.6 J	1 J	10 UJ	10 UJ	10 U	10 U.
Isophorone	10 U	120 J	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	1 J	10 UJ	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	1,000 U	10 U	10 U	2 J	10 U	1 J	6 J	1]	3 J	10 U	1 J	2 J	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	1,000 U	2 J	6 J	1 J	1 J	29	420 J	7 J	25	10 U	81	4 J	2 J	100	10 U	10 U	10 U
Nitrobenzene	10 U	1,000 U	10 U	10 U	10 U	10 U	10 U	100 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	2,500 U	25 U	25 U	25 U	25 U	25 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 R
Phenanthrene	10 U	1,000 U	1 J	8 J	0.8 J	3 J	6 J	22 J	0.6 J	28	10 U	7 J	3 J	6 J	10 U	10 U	10 U	10 U
Phenol	10 U	3,300	10 U	10 U	10 U	10 U	10 U	12 J	10 U	10 U	10 U	10 U	10 U	10 U	28	10 U	10 U	10 R

GROUNDWATER SAMPLES ANALYTICAL RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS

MAY 10-12, 1999

								MAY 10-1	2, 1999									
Powerster	G016	T C04	7.000	T					Sample L	ocation								
Parameter Parameter	G21S	LC01	LC02	LC03	LC04	LC05	LC06	LC07	LC09	LC10	LC11	LC12	LC13	P01	P02	P03	P04	P05
Pyrene	10 U	1,000 UJ	4 J	5 J	10 UJ	2 J	4 J	8 J	10 UJ	19 J	10 UJ	4 J	3 J	8 J	0.9 J	10 UJ	10 UJ	10 U.
Polychlorinated Biphenyls (µ																		
Aroclor 1016	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	. 1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Aroclor 1221	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	2 UJ	2 UJ	2 UJ	2 U	2 U.
Aroclor 1232	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Aroclor 1242	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Aroclor 1248	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Aroclor 1254	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Aroclor 1260	1 U	1 UJ '	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U.
Pesticides (μg/L)														1 031	1 03	1 031		1 0.
4,4'-DDD	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.05 J	0.055 J	0.05 J	0.087 J	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U.
4,4'-DDE	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.03 J	0.1 U	0.082 J	0.12 J	0.1 U	0.1 U	0.05 J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.03
4,4'-DDT	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.03 J	0.1 UJ	0.1 UJ	0.1 UJ	0.045 J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U.
Aldrin	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.16 J	0.034 J	0.05 U	0.05 U	0.05 UJ	0.1 UJ	0.05 UJ	0.05 U	0.05 U.
alpha-BHC	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.038 J	0.05 UJ	0.041 J	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U.
alpha-Chlordane	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.044 J	0.046 J	0.086 J	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U.
beta-BHC	0.05 U	0.28 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.15 J	0.05 U	0.05 U	0.05 U	0.083 J	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U.
delta-BHC	0.05 U	0.15 J	0.05 U	0.05 U	0.05 U	0.05 U	0.037 J	0.1 J	0.039 J	0.065 J	0.016 J	0.037 J	0.065 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.03 0.
Dieldrin	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.038 J	0.1 U	0.032 J	0.097 J	0.1 U	0.1 U	0.036 J	0.03 UJ	0.03 UJ	0.03 UJ	0.03 U	0.043 .
Endosulfan I	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.047 J	0.049 J	0.084 J	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.1 UJ		0.1 U.
Endosulfan II	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.047 J	0.026 J	0.052 J	0.03 U	0.03 U	0.03 U	0.03 UJ	0.03 UJ	0.03 UJ	0.05 U 0.1 U	0.03 U.
Endosulfan sulfate	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.026 J	0.036 J	0.1 U	0.1 U	0.018 J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U.
Endrin	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.04 J	0.1 UJ	0.047 J	0.1 U	0.1 U	0.039 J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 0.
Endrin aldehyde	0.1 U	0.12 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.039 J	0.1 UJ	0.1 UJ	0.1 UJ		
gamma-BHC (Lindane)	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.032 J	0.1 U	0.05 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
gamma-Chlordane	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.03 0J	0.032 J	0.05 U	0.05 U	0.03 U	0.05 UJ			0.05 U	0.05 U
Heptachlor	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.12 J	0.047 J	0.05 U	0.03 U	0.05 U	0.026 J	0.05 UJ	0.05 UJ 0.05 UJ	0.05 UJ	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 UJ	0.05 U	0.05 U	0.034 J	0.05 U	0.05 U	0.12 J	0.048 J	0.05 U	0.02 J	0.05 U	0.05 U	0.05 UJ		0.05 UJ	0.05 U	0.11
Methoxychlor	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.089 J	0.03 U	0.03 U	0.05 UJ			0.05 UJ	0.05 UJ	0.05 U	0.05 U
Toxaphene	5 U	5 UJ	5 U	5.5 U	5 U	5 U	5 U	5 U	5 UJ	5 U			0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U
		2 001		- 30	- 20		3 0	3 0	2 01	30	5 U	5 U	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U.

Key:

 μ g/L = Micrograms per liter.

U = The analyte was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantification limit or sample detection limit.

J = The associated value is an estimate quantity.

B = The associated value is between the instrument detection limit and the contract required detection limit.

UJ = The analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

R = The data are unusable.

Analytical Data Sources:

Inorganics: Data

Datachem Laboratories, Inc., Salt Lake City, Utah.

Organics:

Southwest Laboratory of Oklahoma, Broken Arrow, Oklahoma.

WATER NITROGEN RESULTS LAKE CALUMET CLUSTER SITE CHICAGO, ILLINOIS MAY 3-5, 1999

Units -mg/L

i		Units -mg/L		
	Ammonia (mg/L		- T- (TDYZA)	NY Bilania
Sample Designation	of N)	Total Cyanide	Nitrogen (TKN)	Nitrate-Nitrite
L1W	0.405	ND	ND	0.22
L1WD	0.408	0.011	ND	0.205
L2W	2.22	0.01	2.52	0.616
L3W	71.5	0.013	87.6	0.464
IRP-1	ND	ND	4.2	ND
IRP-2	ND	ND	2.8	ND
IRP-3	0.581	0.01	6.16	0.037
IRP-4	0.267	ND	5.04	ND
IRP-5	0.702	ND	5.6	0.083
IRP-6	0.635	0.013	2.8	0.037
IRP-7	0.545	ND	4.2	ND
IRP-8	ND	ND	3.92	ND
AW1	16.9	0.025	25.9	ND
AW2	49.2	0.012	50	ND
AW3	ND	0.011	ND	ND
AW3D	ND	0.016	2.38	ND
AW4	ND	ND	ND	0.281
P-01	296	0.025	321	ND
P-02	230	0.035	248	ND
P-03	168	0.017	158	ND
P-04	63.6	0.016	118	ND
P-05	215	0.055	178	ND
G21S	20.7	0.014	19.7	ND
LC-01	540	0.014	517	ND
LC02	45.7	0.016	27.9	ND
LC-03	18.5	0.034	23.1	ND
LC-04	44.5	0.012	47.5	ND
LC-05	56.1	0.031	39.3	ND
LC-06	146	0.029	164	ND
LC-07	37.3	0.078	98.1	ND
LC-09	504	0.048	ND	ND
LC-10	413	0.255	417	ND
LC-11	52	0.016	67.6	0.05
LC-12	61.8	0.014	65.1	ND
LC-13	100	0.042	107	ND

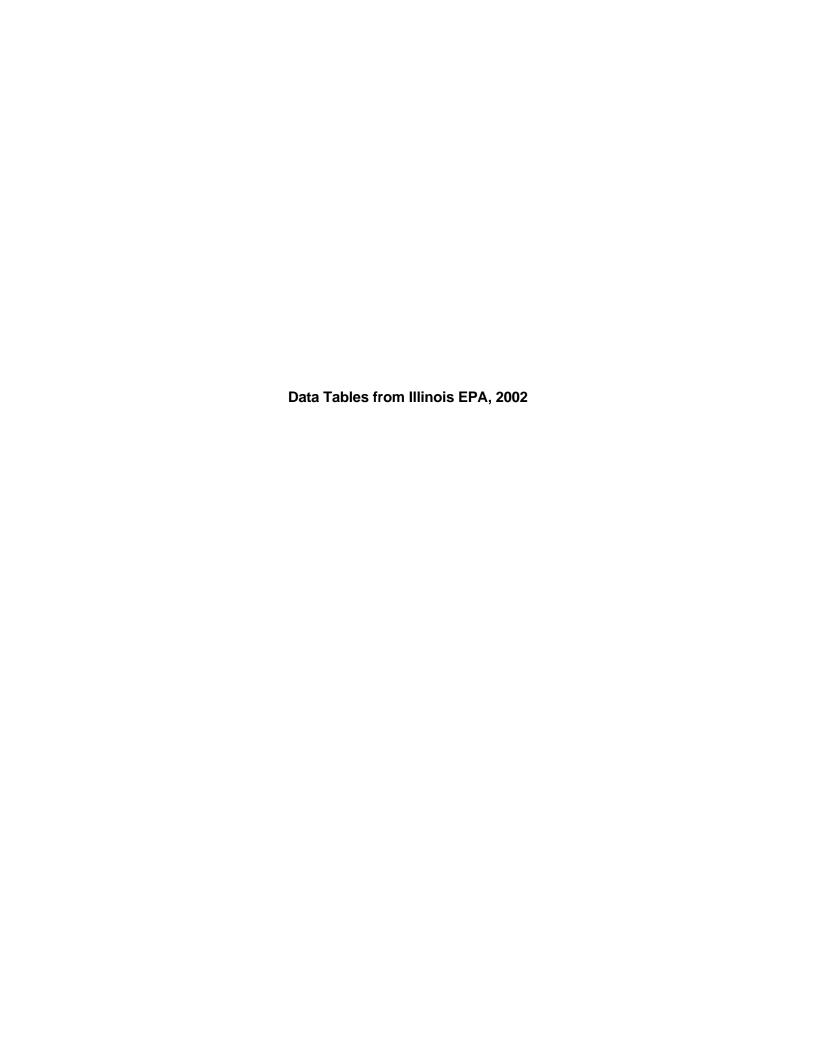
Key:

mg/L = Milligrams per liter. TKN = Total Kjeldahl Nitrogen.

ND = Not detected.

Note: Sample L1WD is a duplicate of sample L1W and sample AW3D is a duplicate of sample AW3.

Source: American Technical & Analytical Services, Inc., Maryland Heights, Missouri.



ATTACHMENT A

July 2002 Cluster Site Groundwater Sampling 25 Total Wells - 20 Sampled - 5 Damaged

Well			LC01A	LC01B	LC03A	LC03B	COR	5007
Unit		``	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ft ms!)			593.38	593.38	593.31	593.31	593.42	594.32
Total Depth (ft)			15	15	14.5	14.5	15	15
Water Level (ft below TOC)		·	8.74	8.74	5.61	5.61	5.65	10.95
Water Column Height (ft)	• •		6.26	6.26	8.89	8.89	9.35	4.05
PID Reading (ppm)		:	2.4	2.4	0	0	0	0
Sample Date			31-Jul	31-Jul	31-Juí	31-Jul	30-Jul	30-Jul
Sample Time			10:05	10:15	9:45	10:10	2:40	14:45
Notes	TAGO 77.2 OLS SELL	TACO 742 Class I	Paxton 1	Paxton I	Paxton I	Paxton I	U.S. Drum II	US Drum II
Sevem Trent Services		ug/L						
Tannin/ Lignin (mg/l) (LC06/LC02/LC11)		Exceedances						
	Exceedances	bolded/larger						
Chemical Oxygen Demand (COD) (mg/L)	highlighted his see	font,	3000	3100	150	. 86	590	100
		ì						
Organochiorine Pesticide Analysis (ugit.)								
Deta-Bric			0.025 U	0.025 U	0.024 U	0.024 U	0.024 U	0.024 U
delta-BHC		TO THE PERSON OF	0.39	0.025 U	0.024 U	0.024 U	0.024 U	0.024 U
Endosulfan i			0.025 U	0.025 U	0.024 U	0.024 U	0.024 U	0.024 ∪
Endosulfan II			0.051 U	0.049 U	0.047 U	0.047 U	0.048 U	0.048 U
Endosulfan sulfate.			0.051 U	0.049 U	0.047 U	0.047 U	0.048 U	· 0.048 U
Methoxychior	2005	1 (2) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	0.25 U	0.25 U	0.24 U	0.24 U	0.24 U	0.24 U
Endrín aldehyde			0.051 U	0.049 U	0.047 U	0.047 U	0.048 U	0.048 U
Endrin ketone			0.051	0.049 U	0.047 U	0.047 U	0.048 U	0.048 U
SVOCs (ug/L)								
1,2-Diphenylhydrazine			97 U	98 U	9.5 U	9.5 U	9.6 U	9.5 U
n-Nitrosodiphenylamine			97 U	98 U	9.5 U	9.5 U	9.6 U	0.5€
Benzidine			970 U	980 U	95 U	0 Se	96	95 U
1,4-Dioxane			500 M	430 M	38 U	32 J	W 69	38 ∪
n-Nitrosodiethylamine			190 U	200 U	19 U	19 U	19 U	19 U
								,
VOCs (ug/L)								
Acrolein			200 U	200 U	200 U	200 U	200 U	200 U
Acetonitrile			40 U	40 U	. 40 ∪	. 40 ∪	40 U	40 U
2-Chloroethyivinylether.			2.0	2.0	. 2 Ú	2.0	20.	2.0
1,3-Butadiene			10	1 U	10	10	ı≀	٦L

				•		٠
Wen		-		LC03B	LC04	LC05
יייים		Š	S	Shallow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ft msl)		593.38 593.38	593.31	593.31	593.42	594.32
Total Depth (代)			14.5	14.5	15	15
Water Level (ft below TOC)		8.74 8.74	5.61	5.61	5:65	10.95
Water Column Height (ft)		6.26 6.26	8,89	8,89	9.35	4,05
PID Reading (ppm)		2.4 2.4	0	0	0	0
VOC TIC IIIII	(1) 10 10 10 10 10 10 10 10 10 10 10 10 10					
VOC 112 (ug/L)						
Benzene, 1-ethyl-2-methyl-		4 3.8			0.41	
U - Analyte was not detected at or above the stated im	ne stated (imit: ************************************					
M - Manually integrated compound.						
,		,	-			
IEPA - INORGANICS						
pin - lab, >2 Hours		. 6.7 .	∞)	7.9	7.1	8.5
Fluoride, Total mg/L		0.38	0.45	0.46	0.24	3.58
Sulfate, Total mg/l.			,			170
. Ammonia - N, Total mg/L		392	. 22	21	115	39
Phosphate - C AS PO4 mg/L			0.84	0.79	0.03K	0.3
Orthophosphate						
BOD 5 DAY mg/L		2700L	15	11	23	27L
Kjeldahl-N, Total mg/L		476	43	1160	320	87
Chromium, Hex ug/L		50K	50K	50K	50K	50K
Magnesium, T mg/L		370	98	98	84	49
Mercury, T ug/L		0.12	0.11	0.10K	0.15	0.10K
Potassium, T.mg/L.		290	54	72	82	100
Antimony, T ug/L		1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	14K	21	19	21
Barium, T ug(L		430	460	420	370	54
Beryllium, T ug/l.		1.0K	1.0K	1.0K	1.0K	1.0K
Chromium, T. ag/L	Market 11/00 00 00 00 Market Market M	45	25	8.3	23	530K
Cobaif, T ug/l.	6 10 00 00 00 00 00 00 00 00 00 00 00 00	7.7	5.0K	5.0K	6.2	6.5
Lead, Tug/L	20 Sept. 100 s	65	62	21	65	16
Nickel, Tug/L	10 E 15 2000 San Se Se 10 D Se	270	17	8.9	88	. 65
Silver, T ug/L		5.0K	5.0K	5.0K	5.0K	5.0K
Thallium, Tug/L	SMAC WOLLD IN THE STATE OF THE SECOND		21 K	Section 18	ALC: Y	MODE 21KG
Zinc, T ug/L	(2004) 10,000 (100) 图5.000 图 10.00	2700	200	120	410	. 100K
TDS @1800 (ROE) mg/L		7530	1170	1150	1320	1610
Chloride, Total mg/L	35 000 000 000 000 000 000 000 000 000 0	BE \$2070 PERM	14 15 C20 C20		100 Telephone	469
Nitrate & NO2 - Ntotal mg/L	N. C. 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	0.01K	0.15	0.06	0.06	0.08
Phosphorous - P, Total mg/L		0.36	0.72	0.54	0.48	0.38
Cyanide, T mg/L	ESSE 780 ESSE TO THE LICENSE 200 1 SEE ESSE	0.01	0.01	0.01	0.01K	0.01K
Solids, TOT, SUS, Mg/L		924	118	114	307	25
Oil, Gravimetric mg/L		100	3	2.7	3.2	4.6

							-
Well		LC01A	LC01B	LC03A	LC03B	1C04	LC05
Unit		Shallow Fill	Shallow Fill	Shallow Fill	Shailow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ft ms!)	S. S. Contraction of the Contrac	593.38	593,38	593.31	593.31	.593.42	594.32
Total Depth (#)		15	15	14.5	14,5	15	15
Water Level (# below TOC)		8.74	8.74	5.61	5.61	5.65	10.95
Water Column Height (ft)		6.26	6.26	8.89	8.89	9.35	4.05
PiD Reading (ppm)		2.4	2.4	ó	0	0	0
	THE STATE OF THE S	And the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the second section is a second section in the second section in the section is a section in the section in the section is a section in the section in the section in the section is a section in the section in the section in the section is a section in the s				,	
Calcium, T mg/L		. 470		140	130	130	52
Sodium, T mg/L		11007		230-1	230J	3000	560
Atumimum, Tug/L		1400		1800	550	2000	190
Arsenic, T ug/L	200 \ \ \ 200 \\ \ \ \ \ \ \ \ \ \ \ \	10K		10K	10K	10K	10K
Boron, Tug/L	(1) 10000 1000 (2) (2) (2) (2) (2) (2) (2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	7400/		1300	1300	2600ii	2500 Sept.
Cadmium, T ug/L		5.0K		5.0K	5,0K	2.0K	5.0K
Copper, T ug/L	West : 650m (Greek Greek 650m Front 1	35		24	5.0K	56.	5.2
Iron, T ug/L	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	50000095 SH		10000 Page 11	.4000	24 0000 PH	2400
Manganese, T ug/L		3700		300	160	470	450
Selenium, Tug/L		30K		30K	30K	30K	30K
Strontium, T ug/L		1400		1600	1600	610	190
Vanadium, T ug/L		5.0K		6.3	5.0K	5.0K	22
IEPA - SVOCs/VOCs/Pest (ug/L)							
Hexachlorobenzene		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Trifluralin		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Alpha-BHC	ARCHIOLOGICAL PROPERTY OF SECURITY	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Gamma-BHC (Lindane)		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Atrazine		0.1 K	0.1 K	0.1 K	0.16	0.1 K	0.1 K
Heptachlor		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Aldrin		0.01 K	0.01 K	0.01 K	0.01	0.03	0.01 K
Acetochlor		0.1 K	0.1 K	0.1 K	0.1 K	0.1 K	0.1 K
Alachlor		0.02 K	0.02 K	0.02 K	0.02 K	0.02 K	0.02 K
Metribuzin		0.05 K	0.05 K	0.05 K	0.05 K	0.05 K	0.05 K
Metolachior		0.1K	0.1 K	0.1 7.	0.1 K	0.1 K	0.1 K
Heptachlor Epoxide		. 0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Pendimethalin		0.05 K	0.05 K	0.05 K	0.05 K	0.05 K	0.05 K
Gamma-Chlordane		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Alpha-Chlordane ,		0.01 K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Total Alpha and Gamma Chlordane		0.1 K	0.1 K	0.1 K	0.1 K	0,1 K	0.1 K
Dieldrin		0.01K	0.01 K	0.01 K	0.01 K	0.01 K	0.01 K
Captan		0.05 K	0.05 K	0.05 KJ	0.05 K	0.05 K	. 0.05 K
Cyanazine		0.1K	0.1 K	0.1 K	0.1 K	0.1 K	0.1 K
Endrin		0.03	0.02	0.01 K	0.01 K	0.01 K	0.01 K
P,P'-DDE		0.03	0.01 K	0.01K	0.01 K	0.01 K	0.01 K
P,P'DDD	15 (15 (15 (15 (15 (15 (15 (15 (15 (15 (0.01 K	0.01	0.06	0.01	0.24	0.01 K
			í				

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Well		LC01A	LC01B	- LC03A	LC03B	FC04	LC05
Unit.		Shallow Fill	Shallow Fill	Shaffow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ff ms!)		593.38	593.38	593.31	593.31	593.42	594.32
Total Depth (ft)		51	15	14.5	14.5	15	. 15
Water Level (# below TOC)		8.74	8.74	5.61	5.61	5.65	10.95
Water Column Height (ft)		6.26	6.26	8.89	8.89	9.35	4.05
PID Reading (ppm)		2.4	2.4	0	0	0	` o
TQC-q-q	第443 李勒特的 1650 1650 1650 1650	0.01 K	0.01 K	0.01 KJ	0.01.K	0.02	0.01 K
Total DDT		0.1 K	0.1 K	0.1 K	0.1 K	0.26	0.1 K
Methoxychior	200 年 200 日 20 日 20 日 20 日 20 日 20 日 20	0.05 K	0.05 K	0.05 K	0.05 K	0.05 K	0.05 K
Total PCBs	的数据。25年,第一日的新疆。	0.1 K	0.1 K	0.1 K	0.26	0.65	0.1 K
Тохарнеле		1.0 K	1.0 K	1.0 K	1.0 K	1.0 K	1.0 K
Phenol	(00) (10) (10) (10) (10) (10)	1,300.00	1,000,000	1.5 K	1.5 K	1.5 K	1.5 KJ
Bis(2-Chloroethyl)Ether		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2-Chlorophenoi		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
1,3-Dichlorobenzene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
1,4-Dichlorobenzene	27.5%	1.5 KJ	1.5 K.	1.5 K	1.5 K	5.4	1.5 KJ
1,2-Dichlorobenzene	2. 2. 1500 (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2-methylphenol	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.5 KJ	1.5 KJ	1.5 K	1.5 K.	1.5 K	1.5 KJ
Bis(2-Chloroisopropyl) Ether		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
4-Methylphenol		4200 KJ	4100 J	1.5 K	1.5 K	1.9	1.5 KJ
N-Nitroso-Di-N-Propy/amine	25 To 25 TO 10 TO	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Hexachloroethane		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Nitrobenzene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Isophorone	1000000	1.5 KJ	17.J	1,5 K	1.5 K	1.5 K	1.5 KJ
2-Nitrophenoi		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2,4-Dimethylphenol	2011 100 Television (100 Telev	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Bis(2-chloroethoxy)Wethane		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2,4-Dichlorophenol		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
1,2,4-trichlorobenzene	10 m 10 m 10 m 10 m 10 m 10 m 10 m 10 m	1.5 KJ	1.5 KJ	1.5 K	1,5 K	1.5 K	1.5 KJ
Naphthalene		30 J	34 J	1.5 K	1.5 K	1.9	1.5 KJ ¹
4-Chioroaniline	1. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Hexachlorobutadiene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5K	1.5 KJ
4-Chioro-3-Methylphenol		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2-methylnaphthalene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1,5K	1.5 KJ
Hexachlorocyclopentadiene	100 Telephone (100 Telephone (100 Telephone (100 Telephone (100 Telephone (100 Telephone (100 Telephone (100 Te		-	1.5 K	1.5 K		
2,4,6-Trichlorophenol	10 miles 10	1.5 KJ	1.5 KJ	1.5.K	1.5 K	1.5 K	1.5 KJ
2,4,5-Trichlorophenol	2000 September 100 September	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2-chloronaphthalene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2-Nitroaniline		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Dimethyiphthalate		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	· 1.5 KJ
Acenaphthylene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2,6-Dinitrotoluene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 k ·	1.5 KJ

;		,	•,				
Well		LC01A	LC01B	LC03A	LC03B	LC04	FC0 2
Chit		Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ft ms!)		593,38	593.38	593.31	593.31	593.42	594.32
Total Depth (ft)		. 15	15	14.5	14.5	,	15
Water Level (ft below TOC)		8.74	8.74	5.61	5.61	5.65	10.95
Water Column Heigh≀ (ft)		6.26	6.26	8.89	8.89	9.35	4.05
PID Reading (ppm)		2 .2.4	2.4	0	0	0	O.
3-Nitroaniline		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Acenaphthene	第100 250 100 100 100 100 100 100 100 100 100 1	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2,4-Dinitrophenol							
4-Nitrophenol		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Dibenzofuran		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
2,4-Dinitortoluene		1.5 KJ	L3 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Diethylphthalate		64 J	F65	1.5 K	1.5 K	1.5.K	1.5 KJ
4-chlorophenyl Phenyl Ether		1.5 KJ	L3 KJ	1.5 K	1.5 K	1,5 K	1.5 KJ
Fluorene	12 12 13 14 15 15 15 15 15 15 15	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
4-Nitroaniline		1.5 KJ	1.5 KJ	1.5 K	ے جن ت	1.5 K	1.5 KJ
[4,6-Dinitro-2-Methylphenol			`			1.5 K	1.5 KJ
4-Bromophenyl Phenyl Ether		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Hexachlorobenzene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Pentachiorophenol		1.5 KJ	1.5 KJ		•	1.5 K	1.5 KJ
Phenanthrene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ -
Anthracene	E-05 (1050)	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Di-N-Butylphthlate	**************************************	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Figoranthene	\$150 (400 ST 12 100 ST 12 (60 ST 1	1.5 KJ	1.5 KJ	1.5 K	1.8	1.5 K·	1.5 KJ
Pyrene		1.5 KJ	1.5 KJ	1.5 K	1,5 K	1.5 K	1.5 KJ
Butyl Benzyl Phthalate		1.5 KJ	1.5 KJ	1.5·K	1.5 K	1.5K	1.5 KJ
3,3'-Díchlorobenzidine		1.5 KJ	1.5 KJ	1.5 KJ	1.5 KJ	1.5 K	1.5 KJ
Benzo(a)anthracene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	741,155 Kd
Chrysene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Bis(2-Ethylhexyl)Phthalate		8.3 J	10)	1.5 K	1.5 K	1.5 K	1.5 KJ
Di-N-Octylphthalate		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	1.5 KJ
Benzo(B)Fluoranthene		1.5 KJ	1.5 KJ	1.5 K	1.5 K	1,5 K	等的405Ki
Benzo(K)Fluoranthene	# # # # # # # # # # # # # # # # # # #	1.5 KJ	1.5 KJ	1.5 K	1.5 K	1.5 K	HELECTIS KUP
Donzo (A) Dyropo	では、100mmので	- Z n Z	1/12/	7127	201	744	7 20 7

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***15IKJ

1.5 KJ

1.5 KJ

2 KJ

1.5 K 1.5 K 2 K

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2 K 2 K

1.5 KJ 1.5 KJ 1.5 KJ 2 K 2 K

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2 2 3 조 조

2 8 2 조 조

2 K

1.5 KJ

1.5 K

1.5 K 1.5 K

#.5 K

1.5 KJ

1.5 KJ

Indeno(1,2,3-CD)Pyrene Dibenzo(AH)Anthracene

Benzo(A)Pyrene

Benzo(GHI)Penylene

Chloromethane Bromomethane Vinyi Chloride Chloroethane

Methylene Chloride

1.5 KL 1.5 KL

Weil		LC01A	LC01B	LC03A	LC03B	LC04	LC05
Unit	÷	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TOC Elevation (ft ms!)		.593 38	593.38	593.31	593.31	593.42	594.32
Total Depth (ft)		15	15	14.5	14.5	5	. 15
Water Level (ft below TOC)		8.74	8.74	5.61	5.61	5.65	10.95
Water Column Height (ft)		6.26	6.26	8.89	8.89	9.35	4.05
PID Reading (ppm)		2.4	2.4	0	0	0	0

		0.000 C 0.000	A CONTRACTOR OF THE PARTY OF TH	The second secon				
Acetone	700	2002	W. S. ION Z. C. S. S. S. S. S. S. S. S. S. S. S. S. S.	Name and	10 K	10 K	10 K	10 K
Trichlorofluoromethane	Market Comments		2 K	2 K	2.K	2 K	2 K	2 K .
Bromochloromethane		多面體的 美祖安。	2 K	2 K	2 KJ	2 KJ	2 K	2.K
Carbon Disulfide	*** 3500	- 12 200 A	2 K	2 K	2 K	2 K	2 K	ý. X
1,1-Dichloroethylene			2 K	2 K	2 K	2 K	2 K	2 K
1,1-Dichloroethane	3200	14 SAN (1007)	90	54	2 KJ	CM Z	2 K	2.K
Trans-1,2-Dichloroethylene	(4) (4) (4) (4) (4) (4) (4) (4) (4) (4)	4 S. S. S. S. S. COO. 18 S. S. S.	4	4	2 K	2 K	2 K	2K
Cis-1;2-Dichloroethylene	1 1 2 00 8 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	清掃#3.073/麦克特等 /[8	95	61	2 K	2.K	2 K	2 K
Chloraform	18 2 10 O H 18 2 18 18 18 18 18 18 18 18 18 18 18 18 18		2 K	2 K	2 KJ	2 KJ	2 K	
1,2-Dichloroethane	## ## 17.25 FEET TO	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2.K	2 K	2.K	2 K	2 K	2 K
2-Butanone(MEK)			7500	7300	5 KJ	5 K	5 K	5.K
1,1,1-Trichloroethane	# 50000 H (1)	1. 4. 1. 1. 200.	2 K	2 K	2 KJ	2 KJ	2 K	2 K
Carbon Tetrachioride			2 K	3 K	2 K	2 K	2%	2 K
Methyl Tert-Butyl Ether			2 K	2 K	2 K	2 K	2 K	2 K
Dichlorobromothane			2 K	2 K	2 K	2 K	2 K	2 K
1,2-Dichloropropoane			2 K	2 K	2 K	2 K	2 K	2 K
Cis-1,3-Dichloropropene			2 K	. 2K	2 K	2 K	2 K	2 K
Trichloroethylene			2.5	2.9	2 K	2 K	2 K	2K .
Chlorodibromomethane	A 10 1 10 1 10 1 10 1 10 1 10 1 10 1 10	071	2 K	2 K	2 K	2 K	2 K	7 2 K
1,1,2-Trichloroethane	St. 1. 50.		2 K	2 K	2 K	2 K	2 K	2 K
Benzene			100 Sept. 17.55 Sept. 100		4.4	4.4	9.9	2.K
Trans-1,3-Dichloropropene			,2 K	2 K	2 K	2 K	2 K	2.K
2-Chloroethyivinyl Ether			13 00					
Bromoform			2 K	2.K	2 K	2 K	2 K	CONTRACTOR OF THE
4-Methyl-2-Pentanone (MIBK)			1300	1800	2 K	2 K	2 K	2 K
2-Hexanone (MBK)			89	63	2 K	2 K	2 K	2 K
Tetrachloroethylene			2 K	2 K	2 K	2 K	2 K	2 K
1,1,2,2-Tetrachloroethane			2 K	2 K.	2 K	2 K	2 K	2 K
Toluene	1000	0.000	1800	2000	2 K	2 K	2 K	2 K
Chiorobenzene	100	001	2 K	2 K	3.1	3	110	2K
Ethylbenzene	(A) (A) (A) (A) (A) (A) (A) (A) (A) (A)	100 Page 200	350	460	2 K	2 K	2 K	2 K
Styrene	2005	STATE STATES	2 K	2.K	2 K	2 K	. 2K	.2K
Xylene	100000 AV	2 2 900 00 2 3 1	1400	1800	2 K	2 K	2 K	2 K

K = Actual Value Not Known, but known to be less than value shown (Value shown is the practical quantitation limit) J ≈ Estimated Value

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Well	PC06	LC07	1,009	1010	LC13	G26F	. 188 - 188	600
Unit	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Sand
TOC Elevation (ft ms!)	591.48	596.33	595 33	594 98	594 13	594 99	603.74	400 FR
Total Danth (#)	,		6	, ,	, t	30.00	t 45	990:06
	2 6	ŗ	0 4 6	2 7	2 .	2 1	<u> </u>	<u> </u>
water Level (R below : OC)	4.35		6.16	6.1	4.45	~	8.8	7.21
Water Column Height (ft)	10.65		13.84	8.9	10.55	က	8.2	6.79
PIO Reading (ppm)	3.2		0	o		7.	19.8	0
Sample Date	30-Jui	Could not	30-Jul	30-Jul	30-Jul	31-Jul		31~Jul
Sample Time	3:15/15:30	Access/Not	13:55	15:00	13:50	11:00		11:07
Notes	US Drum #	Sampled					NO SAMPLE	Paxton 1
	•	Album	US Drum II	US Drum II	Unnamed	Paxton !	Paxton I	
Severn Trent Services		-						
Tannin/ Lignin (mg/l) (LC06/LC02/LC11)	8.8							6.8
The second secon								
Chemical Oxygen Demand (COD) (mg/L)	006		920	006	820	760		069
Organochlorine Pesticide Analysis (ug/L)	,							
beta-BHC	0.024 U		0.025 U	0.024 U		0.027 U		0.024 U
delta-BHC	. 0.024 U .	网络新疆山	0.025 U	0.024 U		0.042		0.024 U
Endosulfan	0.024 U		0.025 U	0.024 ∪		0.027 U		0.024 U
Endosulfan II	0.048 U		0.049 U	0.048 U		0.053 U		0.048 U
Endosulfan sulfate	0.048 U		0.049 U	0.048 U		0.053 U	1. 1911	0.048 U
Methoxychlor	0.24 U		0.25 U	0.24 U		0.27 U		0.24 U
Endrin aldehyde	0.048 U		0.049 U	0.048 U		0.053 U		0.648 U
Endrin ketone	0.048 U		0.049 U	0.048 U		0.053 U		0.048 U
,								
SVOCs (ug/L)			,					
1,2-Diphenyfhydrazine	9.5 U		9.6 U	9.7 U	£ 9.5 U	9.5 U		9.6 U
n-Nitrosodiphenylamine,	9.5 U		9.6 U	9.7 U	9.5 U	9.5 U		9.6 ∪
Benzidine	95 U		n 96	∩ <i>1</i> 6	N 56	95 U		96 U
1,4-Dioxane	. 57 M		W 69	43 M	M 74	38 U		130 M
n-Nitrosodiethylamine j	n 6↓		. N 61	U 61	19 U	19 U		19 U
i.		1000						
VOCs (ug/L.)								
Acrolein	200 U		. 200 U	200 U	200 U	200 U		200 U
Acetonitrile	40 U		40 U	40 U	40 U	40.N	9. 经银币基础	40 U
2-Chloroethylvinylether	2 U		2.0 ∪	2 U	ΩZ	2.0	第一条 	2 U ·
1,3-Butadiene	1 U		1.0 U	10	1 O	J C		D.
							经推荐的路线	

Well	PC06	LC07	1C09	FC40	LC13	G26F	St. 180	50
Unit	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Eil	Challen Fil	ביייטווייקט
TOC Elevation (ft msi)	591.48	596.33	595.33	594.98	594 13	594 99	SOR 74	Sitation Sand
Total Depth (ft)	15	34	20	5	(5)	10.00	±00	390.50
Water Level (# below TOC)	4.35		6.16	, 6	7 45	7 9	2 (4 .
Water Column Height (ft)	10.65		13.84	- c.	10.55	~ ~	Ö 0	7.21
PID Reading (ppm)	3.2		0	0	0	<u></u>	0.2 19.8	۶) رو و
			-			:		Þ
VOC TIC (ug/L.)								
Benzene, 1-ethyl-2-methyl-	1.9		1.6	0.75	2.2			
U - Analyte was not detected at or above the sta	sta							
M - Manually integrated compound.							THE PERSON NAMED IN	
IEPA - INORGANICS								
ph - lab, >2 Hours	7.4		6.9	6.9	7.1	8		6.7
Fluoride, Total mg/L	1.19		0.23	0.23	0.22	0.92		0.46
Sulfate, Total mg/L								
Ammonia - N, Total mg/L	205		188	155	66			393
Phosphate - O AS PO4 mg/L	0.05		0.03K) XEO 0		0.91		0.77
Orthophosphate								
IBOD 5 DAY mg/L	23		. 10	6	25	240		4660
Kjeldahl-N, Total mg/l.	. 220		955	185	101	27		568
Chromium, Hex ug/L	50K		50K	. 30K	50K	50K		50K
Magnesium, T mg/L	140		99	09	66	76		370
Mercury, Tug/L	0.34		0.19	0.69	0.22	0.10K		0.11
Potassium, T mg/L	160		100	72	36	36		270
Antimony, T ug/L	2009		16	21	20	21		24
Barlum, T ug/L	880		480	550	290	300	A 10 25 E 10 10 10 10 10 10 10 10 10 10 10 10 10	400
Beryllium, Tug/L	1.0K		1.0K	1.0K	1.0K	1.0K	经验证的	1.0K
Chromium, T.ug/L	30		28	1	13	13		37
Cobalt, Tug/L	11		7.7	8.8	5.3	8.9		7.5
Lead, Tug/L		1000年間 1000年	40 A 10 A 10 A 10 A 10 A 10 A 10 A 10 A	Ž,	81	83		62
Nickel, Tug/L	26		22		15	41		260
Siiver, I ug/L	5.0K		5.0 K	1	5.0K	5.0K		5.0K
Thallium, T ug/L			100 X 100 X	44 S S I K 20 C	A CONTRACTOR	Sec. 311Ke		部を担ってKE2を記
Zinc, T ug/L	330		460	510	350	350		2400
TDS @1800 (ROE) mg/L	2120		1	1310	1370	1000		•6870
Chloride, Total mg/L			2000	168	180	168		1000 A 100
Nitrate & NO2 - Ntotal mg/L	0.28		0.08	0.1	0.28	0.13		0.05
Phosphorous - P, Total mg/L	1.12		0.95	6.0	0.52	78.0		0.37
Cyanide, T mg/L	0.01K		0.01K	0.01K	0.01K	0.01K		0.01K
Solids, IOT. SUS. Mg/L	512		147	261	108	1227		658
Oil, Gravimetric mg/L	3.8		1.3K	5.3	2.8	15		4.3
								l

\A[a]	900	-		8		•		
	2	200	£03	ຼີ	<u>-</u>	GZ6F	SL-16R	LC02
Chit	Shailow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Sand
TOC Elevation (it msi)	591.48	596.33	595.33	594.98	594.13	594.99	603.74	590,68
Total Depth (ft)	5.	4	50	15	15	10	15	14
Water Level (ft below TOC)	4.35		6.16	6.1.	4,45	7	8	7.24
Water Column Height (ft)	10.65		13.84	.6.8	10.55	ო	8.2	6.79
PID Reading (ppm)	3.2		0	0	0	4 4	19.8	0
								1
Calcium, T mg/L	110		170	170	100	180		460
Sodium, Tmg/L	6000		430J	250J	3301	170		11007
Alumimum, T ug/L	2000		1500	2300	800	3200		1100
Arsenic, T ug/L) Y01		Ę,	10K	10K	19K		10K
Boron, T ug/L	14500 F		27.00	1900	\$2000 E	720		24 nn 25 an
Cadmium, T ug/L	5.0K		5.0K	5.0K	5.0X	5.0K		5.0K
Copper, Tug/L	; 58		49	88	20	28		28
Ircn, T ug/L	25000		38000	45000	28000	140000		SE SOUTH SE
Manganese, T ug/L	620		470	450	190	640		3400
Selenium, T ug/L	30 K		30K	30K	30K	30K		30K
Strontlum, T ug/L	. 510		550	520	460	1400		.1400
Vanadium, T ug/L	13	与 的复数 医毒素性	5.0K	5.2	5.0K	12		5.0K
IEPA - SVOCs/VOCs/Pest (ug/L)								
Hexachlorobenzene	0.01 K		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
Triffuralin	0.01 K		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
Арћа-ВНС	0.01 K		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
Gamma-BHC (Lindane)	0.01 K		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
Atrazine	0.1 K		0.1 K	0.1 K	0.1 K	0.1 X		0.1 K
Heptachlor	0.01 K		0.01 K	0.01 K	0.01 K	0.01K		0.01 K
Aldrin	0.04		0.04	0.01 K	0.07	0.03		0.01 K
Acetochlor	0.1 K		0.1 K	0.1 K	0.1 K	0.1 K		0.1 K
Alachlor	. 0.02 K		0.02 K	0.02 K	0.02 K	0.02 K		0.02 K
Metribuzin	0.05 K		0.05 K	0.05 K	0.05 K	0.05 K		0.05 K
Metolachior	0.18		0,1 K	.0.12	0.1	0.1 K		0.1 K
Heptachlor Epoxide	0.01 K		0.01 K	0.01 K	0.01 X	0.01 K		0.01 K
Pendimethalin	90.0		0.05 K	0.05 K	0.07	0.05 K		0.05 K
Gamma-Chiordane	0.01 K		0.01 K	0.01 K	0.02	0.01 K		0.01 K
Alpha-Chlordane :	0.02		0.01 K	0.01 K	0.02	0.01 K		0.01 K
Total Alpha and Gamma Chlordane	0.1 K		0.1 K	0.1 K	0.1 K	0.1 K		0 #X
Dieldrin	0.01 K		0.01 K	0.01 K	0.01 K	0.02		0.01 K
Captan	0.05 K		0.05 KJ	0.11 J	0.05 K	0.05 K		0.05 K
Cyanazine	0.1 K		0.1 K	0.1 K	0.1 K	0.1 K		0.1K
Endrin	0.01 K		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
P,P'-DDE	0.04		0.01 K	0.01 K	0.01 K	0.01 K		0.01 K
P.P.DDD	0.12		0.02	0.02	0.01 K	0.02		0.04

Weil	LC06	LC07	LC09	LC10	LC13	G26F	SL-16R	LC02
Unit	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Sand
TOC Elevation (ft ms!)	591.48	596.33	595.33	594.98	594.13	594.99	603.74	590.68
Total Depth (ft)	15	4	20		15	10	. 15	14
Water Level (ft below TOC)	4.35		6.16	6.1	4.45	7	6.8	7.21
Water Column Height (ft)	10.65		13.84	8.9	10.55	ღ	8.2	6.79
PID Reading (ppm)	3.2	•	0	0	0		19.8	o
P.P. DDT	10.01		0.01 J	J. 10.0	0.01	0.02		X 100
Total DDT	0.17		0.1 K	0.1 K	0.1K	0.1 K		0.1 K
Methoxychior	0.05 K		0.05 K	0.05 K	0.05 K	0.05 K		0.05 K
Total PCBs	1.4		0.58	1.3	7.	0.48		0.1 K
Toxaphene	1.0 K		1.0 K	1.0 K	1.0 K	1.0 K		1.0 K
Phenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Bis(2-Chloroethyl)Ether	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2-Chlorophenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
1,3-Dichlorobenzene	1.5 %		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
1,4-Dichlorobenzene	1.5 KJ	ができた。	2.3	2.2	1.5 K	2		1.5 K
1,2-Dichlorobenzene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2-methylpheno!	1.5 KJ		7	1.5 K	1.5 K	1.5 K		1.5 K
Bis(2-Chforoisopropyi) Ether	2.6 J		7	3.4	1.5 K	1.5 K		1.5 K
4-Methylphenol	1.5 KJ		1.5 K	1.5 K	1.7	1.5 K	建筑建筑建筑	1.5 K
N-Nitroso-Di-N-Propylamine	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Hexachloroethane	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Nitrobenzene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K	阿尔里特斯里	1.5 K ·
Isophorone	1.5 KJ		1.5 K	1.5 K	1,5 K	1.5 K		1.5 K
2-Nitrophenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2,4-Dimethy/phenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Bis(2-chloroethoxy)Methane	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2,4-Dichlorophenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
1,2,4-trichtorobenzene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5K
Naphthalene	. 18 J		8.8	13	1.5K	1.5 K		1.5 K
4-Chloroaniline	1.5 KJ		1.5 K	2.7	1.5K	15K		1.5K
Hexachlorobutadiene	1.5 KJ		1.5 K	1.5 K	1.5K	1.5 K		1.5 K
4-Chioro-3-Methylphenol	1.5 KJ		1.5 K	1.5K	1.5 K	1.5 K		1.5 K
2-methylnaphthalene	15 J		1.5 K	1.5 K	1.5K	1.5 K		1.5 K
Hexachiorocyclopentadiene	•		1.5 K	1.5 K		1.5 K		1.5 K
2,4,6-Trichlorophenoi	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2,4,5-Trichiorophenoi	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K	Special Control	1.5 K
2-chloronaphthalene	1.5 KJ		1.5 K	1.5K	1.5K	1.5 K		1.5 K
2-Nitroaniline	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Dimethylphthalate	1.5 KZ		1.5 K	1.5 K	1.5K	1.5 K		1.5 K
Acenaphthylene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
2,6-Dinitrotoluene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5K

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Well	PC06	LC07	FC09	LC10	LC13	G26F	SL-16R	, LC02
Unit	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Sand
TOC Elevation (ft ms!)	591,48	596.33	. 595.33	594.98	594.13	594.99	603 74	590 68
Total Depth (ft)	15	14	20.	15	5	. 01	15	14
Water Level (ft below TOC)	4.35		6.16	6.1	4.45		, ac	7.27
Water Column Height (ft)	10.65		13.84	G. 60	10.55	- ო) K	8.79
PID Reading (ppm)	3.2		0	C	c	· -	8 01) (
7	!		• · · · · · · · · · · · · · · · · · · ·) ,;;,	•	3	D.e.	>
3-Nitroaniline	1,5 KJ	101616	1.5 K	1.5 K	1.5 K	1.5 K		1,5 K
Acenaphthene	1.5 KJ		1.5 K	1.5 K	1.5 K	1,5 K		2. 7.5.
2,4-Dinitrophenol			1	5.0 K		1.5 K		
4-Nitrophenol	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Dibenzofuran	1,5 KJ	第一条数据	1,5 K	1,5 K	1.5 K	1.5 K		1.5 K
2.4-Dinitortoluene	1,5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Diethylphthalate	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		₹.
4-chlorophenyl Phenyl Ether	1.5 KJ		1.5 K	1.5 K	1,5 K	1.5 K		1.5 K
Fluorene	1.6 J		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
4-Nitroaniline	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
4,5-Dinitro-2-Methylphenol	1.5 KJ			1.5 K	1,5 K	1.5 K		
4-Bromophenyl Phenyl Ether	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Hexachlorobenzene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Pentachlorophenol	1.5 KJ			5.0 K	1.5 K	1.5 K		
Phenanthrene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Anthracene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Di-N-Butylphthlate	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Fluoranthene	1.5 KJ		1.5 K	1.8	1.5 K	1.5 K		1.5 K
Pyrene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Butyl Benzyl Phthalate	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
3,3'-Dichlorobenzidine	1.5 KJ		1.5 KJ	1.5 KJ	1.5 K	1.5 K		1.5 KJ
Benzo(a)anthracene			1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Chrysene	1.5 KJ		1.5 K	1.5K	1.5 K	1.5 K		1.5 K
Bis(2-Ethylhexyl)Phthalate	3.6 J		4.6	6.7	2.4	1.5 K	88500 米川森 和	1.5 K
Di-N-Octylphthalate	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Benzo(B)Fluoranthene			1.5 K	1.5 K	1.5K	1.5 K		1.5 K
Benzo(K)Fluoranthene			1.5 K	1.5 K	1.5 K	1.5 K		1.5 K
Benzo(A)Pyrene	1.5 KJ		1.5 K	1.5 K	1.5K	1.5 K		1.5 K
Indeno(1,2,3-CD)Pyrene	1.5 KJ		1.5K	1.5 K	1.5 K	1.5 K		1.5 K
Dibenzo(AH)Anthracenie	10 S 10 S		1.5K	1.5 K	1.5 K	1.5 K		1,5 K
Benzo(GHI)Perylene	1.5 KJ		1.5 K	1.5 K	1.5 K	1.5 K	第二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十	1.5 K
Chloromethane	2 K		2 K	2.K	2 K	2 K		2 K
Bromomethane	2 KJ		2 K	2 K	2 KJ	.2 KJ		· 2K
Vinyl Chloride	2 K		2 K	2.K	2 K	2 K		2 K
Chloroethane	2K		10	2 K		2 K		2 K
Methylene Chloride	5.5		5 KJ	5 KJ	5.K	5 K		5 KJ

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Well	PC06		6007	LC10	LC13	G26F	SL-16R	£ C02
Cinit	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Sand
TOC Elevation (ft msl)	591,48	596.33	595.33	594.98	594 13	594.99	603.74	590.68
Total Depth (ft)	. 15	14	20	5	15.	10	15	. 4
Water Level (ft below TOC)	4.35		6.16	6.1	4.45	. 2 .	6.8	7.21
Water Column Height (ft)	10.65		13.84	6.8	10.55	ю	8.2	6.79
PID Reading (ppm)	3.2		.		0	<u>.</u>	19.8	
		2	7. 47			;	The state of the s	
Acetone	10 K		10 K	10 K	10 K	10 K		10 K
Trichloromethane	2K		2 K	2K	2 K	2 K		2 K
Bromochloromethane	2.K	では、	2 KJ ·	2 KJ	2 K	2.K	在4000年	2 KJ
Carbon Disulfide	.2 K	一会の変化を	2 K	2 K	2 K	2 K		2 K
1,1-Dichloroethylene	2 K	1000	2 K	2 K	2 K	2 K		2 K.J
1,1-Dichloroethane	2 K		2 KJ	2 KJ	. 2 K	2 K		2 KJ
Trans-1,2-Dichloroethylene	2 K		2 K	2 K	2 K	2.K		2 K
Cis-1,2-Dichloroethylene	2 K		2 K	2 K	2 K	2 K		2 X
Chloroform			2 KJ	2 KJ	2 K	2 K		2 2 2
1,2-Dichloroethane	2 K		2 K	2 K	2 K	2 K		2 K
2-Butanone(MEK)	2 K		5 K	5 K	5 X	5. 5.		5 X
1,1,1-Trichloroethane	2.K		. 2 KJ	2 KJ	2 K	2K		2 KJ
Carbon Tetrachioride	2 K		2 K	2K	2 K	2 K		2 K
Methyl Tert-Butyl Ether	2 K		2 K	2 K	2 K	2 K	建筑是是是	2 K
Dichlorobromomethane	2 K		2 K	2 K	2 K	2 K		2.K
1,2-Dichloropropoane	2 K		. 2K	2 K	2 K	. 2K		2 K
Cis-1,3-Dichloropropene	2 K		2 K	2 K	2.K	2 K		2 K
Trichtoroethylene	2 K		2 K	2 K	2 K	2 K		2.K
Chiorodibromomethane	2 K		2 K	2 K	2 K	2.K		2 K
1,1,2-Trichloroethane	2 K		2.8	2 K	żК	2 K		2 K
Benzene	19		6.9	7.6		2 K		2 K
Trans-1,3-Dichloropropene	2 K		2 X	2 K	2 K	2 K		2 K
2-Chloroethylvinyl Ether								
Bromoform	STATE OF THE STATE		2.K	2 K	2 K	2 K		2 K
4-Methyl-2-Pentanone (MiBK)	2 K		2.K	2 K	2 K	2 K		. 2K
2-Hexanone (MBK)	2 K		2 K	2K	2 K	2 K		2 KJ
Tetrachloroethylene	2 K		2.K	2K	2 K	2 K		2 K
1,1,2,2-Tetrachloroethane	2 K		2.K	2 K	. 2K	2 K		2 K
Toluene	2 K		2.K	2 K	2.K	. 2K		2 K
Chlorobenzene	16		6.6	12	8.8	4.4		2 K
Ethylbenzene	2 K		2.5	2 K	2 K	2.K		2 K
Styrene	2 K		2 K	2 K	2K	2 K		.2K
Xylene	2 K		16	2	2 K	2 K		2K

K = Actual Value Not Known, but known to be le J = Estimated Value

Well	CO2 Dura	3	10.49	96-13	36,50	0.75	0,70	
1.01	Chailour Coad	10 1 H	10.4	24 - 15 C	3 6	2 0	26.5	0775
	OHERIOW CENT	oilly clay	olity Cray	olity Clay	Silty Clay	Lower Sand	Lower Sand	Lower Sand
OC Elevation (it msi)	590.68	593.5	592.71	596.77	594,31	589,65	590.55	595,55
Total Depth (ft)	14	19	15	, ;	12	15	43	48
Water Level (ft below TOC)	7.21	7.3	9	-	10.31	8.13	11.7	8 667
Water Column Heigh! (ft)	6.79	11.7	o:		1 69	6.87	, r	30.34
PID Reading (ppm)	c	· c	, ,) :) })	t
7		,	J		>	o	5	5
Sample Date		30-Jul	30-Jui		31-Jul	31-Jul	31-Jul	7/31 &8/01
Sample Time		15:40	16:15		8:00/14:50	9:00	8:40	8:00
Notes	Paxton I	US Drum II	US Drum II	NO SAMPLE	Incomplete	Paxton II	Paxton 1	Alburn
O de contractor			×	Paxton II	Paxton II		-	
Cavella Lieura Caratta de Caratta		ļ		Contraction of the Contraction o				
ושוווות רומנייו (נומני) (רכממירכמקרכנו)		4						
		,						
Chemical Oxygen Demand (COD) (mg/L)		130	890			89	47	620
Organochlorine Pesticide Analysis (ug/L)		,						
beía-BHC		0.024 U	0.027 U			0.024 U	0.024 U	0,025 U
delta-BHC		0.024 U	0.027 ∪			0.024 U	0.024 U	0.025 U
Endosulfan		0.024 U	0.027 U			0.024 ∪	0.024 U	0.025 U
Endosulfan II		0.048 U	· 0.053 U			0.048 ∪	0.049 U	0.050 U
Endosulfan sulfate		0.048 U	0.053 U			0.048 U	0.049 U	0.050 U
Methoxychlor		0.24 U	0.27 U			0.24 U	0.24 U	0.25 U
Endrin aldehyde		0.048 U	0.053 U			0.048 U	0.049 U	0.050 U
Endrin ketoné		0.048 U	0.053 U		,	0.048 U	0.049 U	0.050 U
SVOCs (ug/L)								
1,2-Diphenylhydrazine		9.6 U	9.5 U		10 0	9.8 U	9.6 U	11 U
n-Nitrosodíphenylamine		9.6 U	9.5 U		10 U	9.8 U	9.6 U	110
Benzidine		96 U	95 U		100 U	0 86	. n 96	110 U
1,4-Dioxane		67 M	130 M		240 M	39 U	38 U	360 M
n-Nitrosodiethylamine		19 U	19 U		20 ∪	20 U	19 U	21 U
VOCs (ug/L)								
Acrolein		200 U	. 200 U		2000 U	200 U	200 ∪	2000 U
Acetonitrile		40 ∪	40 U		400 U	40 U	40 U	400 U
2-Chloroethylvinylether		2.0	2 U		20 U	2.0	2.0	20 ∩
1,3-Butadiene		10	1.0		10 U	10	Ωŀ	10 U

Well	LC02 Dup	LCH	LC12	SL-26	G13S	G11S	G19D	G22D
Juit	Shallow Sand	Silty Clay	Sifty Clay	Silty Clay	Silty Clay	Lower Sand	Lower Sand	Lower Sand
FOC Elevation (ft msl)	590.68	593.5	592.71	596.77	594,31	589.65	590.55	595.55
fotal Depth (律)	14	, 1,9	. 15		12	15	43	48
Nater Level (ft below TOC)	7.21	7.3	9		10.31	8.13	11.7	8.662
Nater Column Height (ft)	6.79	11.7	6		1.69	6.87	31.3	39.34
PID Reading (ppm)	0	0	2.		0	0	0	0
VOC TIC (ug/L)								
Senzene, 1-ethyl-2-methyl-			2.3		16			
							_	
J - Analyte was not detected at or above the st	ę							
M - Manually integrated compound.								
TDA MODE ANDS								
ob - lab >2 Hours	7.3	7.4	7.8			7.0	o	1
Elizabe Total mail	2 7	1 070	2 5			E: 7	0 0	0.7
Culture Total man	4.1	0.40	00			0.92	0.87	0.46
Suisie, tudi iligit.	7	5	5			279		
Obserbate O & DOA	7500	70	60		460	4	7.	61
Orthophosphafe	0.050	0.92	0.03K			0.04	3.2	
3OD 5 DAY mod	75		140			000	0	3
Kieldahl-N. Total mo/L	149	. 6	447		634	5. 7.	200	130
Chromium, Hex ug/L	50K	20X	20 <u>K</u>			30K	50K	25.
Magnesium, Tmg/L	280	86	92				53	240
Wercury, T ug/L	0.14	0.10K	0.10K			0.10K	0.10K	0.10K
Potassium, T mg/L	74	82	66				20K	96
Antimony, Tug/L	16	14K	14K			17	74K	747 X4
Barium, T ug/L.	1200	400	290			260	150	1600
Beiyllium, T ug/L	7.0X	1.0X	1.0K			2.5	1.8	1.0K
Chromium, T ug/L	18	12	10			62	250	39
Cobalt, T ug/L	23	5.0K	5.0K				28	17
Lead, Tug/L	38	16	10			280	39	47
Nickel, Tug/L	200	9	47			94	029	56
Silver, T ug/L	5.0K	5.0K	5.0K			5.0K	3:0K	5.0K
Fhallium, T ug/l.	**************************************	100	Terral Manager			316	YIE .	S. SOUK
Zinc, T ug/L	120	100K	100K				260	160
TDS @1800 (ROE) mg/L	4110	1690	1520			1270	482	3850,
Chloride, Total mg/L		×11				102	38.7	E 2 946
Nitrate & NO2 - Ntotal mg/L	0.17	0.03	0.03		0.14	0.05	0.05	0.21
Phosphorous - P, Total mg/L	0.57	6.0	0.5		1.07	2.77	4.84	0.57
Cyanide, T mg/L	0.01K	0.01Ķ	0.01K			0.06	0.01K	0.01
Solids, TOT. SUS. Mg/L	1040	130	741			16800	39200	111
Oil, Gravimetric mg/L	2.7	4.3	1.7			260		1.8

Cyanide, T mg/L Solids, TOT. SUS. Mg/L Oil, Gravimetric mg/L

	•								
Well	LC02 Dup	LC1	LC12	SL-26	G13S	G11S	G19D	G22D	
Unit	Shallow Sand	Sifty Clay	Silty Clay	Silty Clay	Silty Clay	Lower Sand	Lower Sand	Lower Sand	
TOC Elevation (ft ms:)	590.68	593.5	592.71	596.77	594.31	589.65	590.55	595.55	
Total Depth (作)	14	19	15		12	5	£	48	
Water Level (ft below TOC)	7.21	7.3	φ		10.31	8.13	11.7	8.662	
Water Column Heigh! (ft)	6.79	11.7	თ		1,69	6.87	31.3	39.34	
PID Reading (ppm)	0	0	8	_	0	0	0	0	
			,					,	
Calcium, T mg/L	410	190	360				110	370	
Sodium, T mg/L	1100J	360J	3201				1001	10007	
Alumimum, T ug/L	4000	1600	1200				27600	3600	
Arsenic, Tug/L	ŽĮ.	ş	, , 5			35	10K	. YO	
Boron, T ug/L	1300	4.2100 E	1900				Sec. 22008	\$500 S	
Cadmium, Tug/L.	5.0K	5.0K	5.0K			5.0X	5.0X	5.0K	
Copper, T ug/L	: 16	5.6	30				220		
Iron, T ug/L	255000675	3300	0000				39000	828.3	
Manganesè, T ug/L	1200	150	120				069		
Selenium, T ug/L.	30K	30K	30K			30K	30K	30K	
Strontium, T ug/L	3700	1800	3200				3000	11000	
Vanadium, ⊺ ug/L	22	9.0K	6.6			79	45	35	
IEPA - SVOCs/VOCs/Pest (ug/L)									
Hexachlorobenzene		0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	•
Trifluralin		0.01 K	0.01 K			0,01 K	0.01 K	0.01 K	
Alpha-BHC		0.01 K	0.01 K		-	0.01 K	0.01 K	0.01 K	
Gamma-BHC (Lindane)		0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
Atrazine		0.1 K	0.1 K			0.1 K	0.1 K	0.1 K	
rieptachlor		0.01 K	0.01 K		,	0.01 K	0.01 K	0.01 K	
Aldrin	-	0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
Acetochlor	,	0.1 K	0.1 K			0.1K	0.1 K	0.1 K	
Alachlor		0.02 K	0.02 K			0.02 K	0.02 K	0.02 K	
Wetribuzin		0.05 K	0.05 K			0.05 K	0.05 K	0.05 K	
Metolachior		0.1 K	0.1 K			0.1 K	0.1 K	0.1 K	
Heptachlor Epoxíde		0.01 K	0.01 X			0.01 K	0.01 K	. 0.01 K	
Pendimethalin		0.05 K	0.05 K			0.05 K	0.05 K	0.05 K	
Gamma-Chlordane		0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
Apha-Chlordane ;		0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
Total Alpha and Gamma Chlordane	-	0.1 K	0.1 K			0.1 K	0.1 K	0.1 K	
Dieldrin		0.01 K	0.01 K			0.01 K	0.01 K	0,01 K	
Captan		0.05 KJ	0.05 KJ			0.05 K	0.05 K	0.05 K	
Cyanazine	`	0.1 K	0.1 K			0.1 K	0.1 K	0.1 K ·	
Endrin	,	0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
P,P-DDE		0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	
P,P-DDD	-	0.01 K	0.01 K			0.01 K	0.01 K	0.01 K	

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Well	LC02 Dup	164	. LC12	SL-26	G13S	G115	G19D	G22D
Unit	Shallow Sand	Silty Clay	Silty Clay	Silty Clay	Sifty Clay	Lower Sand	Lower Sand	Lower Sand
TOC Elevation (ft msf)	590.68	593.5	592.71	596.77	594.31	589.65	590.55	595.55
Total Depth (ft)	14	19	5		12	15	64	60
Water Level (ft below TOC)	7.21	7.3	ဖ		10.31	8.13	11.7	8,667
Water Column Height (ft)	6.79	11.7	თ	,	1.69	6.87	31.3	39.34
PID Reading (ppm)	0	0	7		,0	0	0	
	,				-			
P.PDDT		0.01 KJ	0.01 KJ	电影的影响		0.01 K	0.01 K	0.01 K
Total DDT		0.1 K	0.1 K			0.1 K	0.1 K	0.1 K
Wethoxychlor		0.05 K	0.05 K			0.05 K	0.05 K	0.05 K
Total PCBs		0.1 K	0.1 K			0.1 K	0.1 K	0.1 K
Тохарћепе		1.ò K	1.0 K			1.0 K	1.0 K	1.0 K
Phenol		1.5 K	100			1.5 KJ	1.5 KJ	1.5 K
Bis(2-Chloroethyl)Ether		1.5 K	1.5 K	电影响力的		1.5 KJ	1.5 KJ	1.5 K
2-Chlorophenol		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
1,3-Dichlorobenzene		1.5 K	1.5 K			1.3 KJ	1,5 KJ	1.5 K
1,4-Dichlorobenzene		1.5 K	2.3			1.5 KJ	1,5 KJ	1.5K
1,2-Dichlorobenzene		1.5 K	1.5 K	国际公司		1.5 KJ	1.5 KJ	1.5 K
2-methylphenol		1.5 K	6.8			1.5 KJ	1.5 KJ	1.5 K
Bis(2-Chloroiscpropyl) Ether		1.5 K	1.5.K			1.5 KJ	1.5 KJ	1.5 K
4-Methylphenol		1.5 K	100			1.5 KJ	1.5 KJ	1.5 K
N-Nitroso-Di-N-Propylamine		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Hexachloroethane		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Nitrobenzene	÷	1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Isophorone		1.5 K	32			1.5 KJ	1.5 KJ	1.5 K
2-Nitrophenol		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
2,4-Dimethylphenol		1.5 K	12			1.5 KJ	1.5 KJ	1.5 K
Bis(2-chloroethoxy)Methane		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
2,4-Dichlorophenol		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
1,2,4-trichlorobenzene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Naphthalene		1.5 K	સ			1.5 KJ	1.5 KJ	1.5 K
4-Chloroaniline	-	1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Hexachlorobutadiene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
4-Chloro-3-Methylphenol		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
2-methylnaphthalene	-	1.5 K	14			1.5 KJ		1.5 K
Hexachlorocyclopentacliene		1.5 K	1.5 K				1.5 KJ	1.5 K
2,4,6-Trichlorophenol		1,5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
2,4,5-Trichlorophenol		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
2-chioronaphthalene		1.5 K	1.5 K	斯勒子和斯勒		1.5 KJ	1.5·KJ	1.5 K
2-Nitroeniline		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Dimethylphthalate		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Acenaphthylene		1.5 K	1.5 K			1.5 KJ	1.5 KJ*	1.5 K
2,6-Dinitrotoluene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K

Well	LC02 Dup	LC11	LC12	SL-26	G13S	G11S	G19D	G22D
Unit	Shallow Sand	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Lower Sand	Lower Sand	Lower Sand
TOC Elevation (ff msl)	590,68	593.5	592.71	596.77	594.31	589.65	590.55	595.55
Total Depth (ft)	41	19	15		12	15	43	48
Water Level (ft below TOC)	7.21	7.3	•		10.31	8.13	11.7	8.662
Water Column Height (ft)	6.79	11.7	Ø		1.69	6.87	31.3	39.34
PID Reading (ppm)	0	0	8	全级代码 法事等分	0	0	0	
3-Nitroaniline		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Acenaphthene		1.5 K	4.5		,	1.5 KJ	1.5 KJ	1.5 K
2,4-Dinitrophenol								5.0 K
4-Nitrophenol		1.5 K	. 1.5 K			1.5 KJ	1.5 KJ	1.5 K
Dibenzofuran		1.5 K	2.7			1.5 KJ	1.5 KJ	1.5 K
2,4-Dinitortoluene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Diethylphthalate		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
4-chlorophenyl Phenyl Ether		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Fluorene		1.5 K	3.7			1.5 KJ	1.5 KJ	1.5 K
4-Nitroaniline		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
4,6-Dinitro-2-Methylphenol						1.5 KJ		1.5 K
4-Bromophenyl Phenyl Ether		1.5 K	1.5 K			1.5 KJ	1,5 KJ	1,5 K
Hexachlorobenzene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Pentachlorophenol		,			- M-M-M	1.5 KJ	1.5 KJ	5.0K
Phenanthrene		1.5 K	6.4			1.5 KJ	1.5 KJ	1.5 K
Anthracene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5K
Di-N-Butylphthlate	-	1.5 K	1.5 K		·	1.5 KJ	1.5 KJ	1.5 K
Fluoranthene		1.5 K	1.5 K		200	1.5 KJ	1.5 KJ	1.5 K
Pyrene		1.5 K	1.5 K		1 230	1.5 KJ	1.5 KJ	1.5 K
Butyl Benzyl Phthalate		1.5 K	. 1.5 K		.	1.5 KJ	1.5 KJ	1.5 K
3,3'-Dichlorobenzidine		1.5 KJ	1.5 KJ			1.5 KJ	1.5 KJ	1.5 KJ
Benzo(a)anthracene		1,5 K			Zinc	1.5 KJ	1.5 KJ	1.5 K
Chrysene		1.5 K	1.5 K	基础是多级的	uer	1.5 KJ	1.5 KJ	1.5 K
Bis(2-Ethylhexyl)Phthalate	,	1.5 K	1.5 K			1.5 KJ	6.13	7.5
Di-N-Octylphthalate		1.5 K	1.5 K		5.42	1.5 KJ	1.5 KJ	1.5 K
Benzo(B)Fluoranthene		1.5 K	A SECTION AND A		DAI'42	1.5 KJ	1.5.KJ	1.5 K
Benzo(K)Fluoranthene		1.5 K			1905	1.5 KJ	1.5 KJ	1.5 K
Benzo(A)Pyrene		1.5 K	1.5 K			1.5 KJ	1.5 KJ	1.5 K
Indeno(1,2,3-CD)Pyrene		1.5 K	1.5 K		Sea N	1.5 KJ	1.5 KJ	1.5 K
Dibenzo(AH)Anthracenie		1.5 K			3320	1.5 %	1.5 KJ	1.5 K
Benzo(GHI)Perylene		1.5 K	1.5 K		ASSA#	1.5 KJ	1.5 KJ	1,5 K
Chloromethane	,	2 K	2X		10 K	5.K	2 K	2.K
Bromomethane		2 K	7X		10 K	2 KJ	2 K	2 K
Vinyl Chlaride		2 K			10 K	2 Ř	2 K	2 K
Chloroethane		2 X	2 K		10 K	2 K	2 K	2 K
Methylene Chloride		5 KJ	24.J		25 K	5 K	5 K	5 K

Well	LC02 Dup	LC11	LC12	SL-26	G13S	G11S	G19D		
Unit	Shallow Sand	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Lower Sand	Lower Sand		
TOC Elevation (ft msl)	590.58	593.5	592:71	. 596 77	594.31	589.65	590.55		
Total Depth (ft)	14	19	15		12	15	43		
Water Level (fi below TOC)	. 7.21	7.3	φ		10.31	8.13	11.7		
Water Column Height (ft)	6.79	11.7	o		1,69	6.87	31.3		
PID Reading (ppm)	0	Q	2		0	0	0	0	
Acetone		10 K	10 K	经验 产业为 :		10 K	10 K		
Trichlorofluoromethane		2.K	2 K		10 K	2 K	2 K	2K	
Bromochloromethane		2 KJ	25.		10 K	2 K	2 K	2.K	
Carbon Disulfide		2 K	2 K		. 10 K	2K	2 K	2 K	
1,1-Dichloroethylene		2 K	2 K		10 K	2 K	2 K	2 K	
1,1-Dichloroethane		2 KJ	. 2 KJ		707	2 K	2 7 2	2 K	
Trans-1,2-Dichioroethylene		2 K	2 K		10 K	2 K	2 K	2 K	
Cis-1,2-Dichloroethylene		2 K	2 K		10 K	2 K	2.K	2.K	
Chloroform		2 KJ			10 K	2K	2.K	2 K	
1,2-Dichloroethane		2 K	21		70 X	2 X	2 K	2 K	
2-Butanone(MEK)		5 K	5 K			5.5	ъ Ж		
1,1,1-Trichtoroethane		2 KJ	2 KJ		10 K	2 K	2.K	2 K	
Carbon Tetrachloride		2.K	2 K		. 10 K	2 X	2 K	2 K	
Methyl Tert-Butyl Ether		2 K	2 K		10 K	2 K	2 K	2.K	
Dichlorobromomethane		2 K	2 K		10 K	2.K	2 K	2.K	
1,2-Dichloropropane		2 K	2 K		10 K	2 K	2 K	2 K	
Cis-1,3-Dichloropropene		2 K	2 K		10 K	2.K	2 K	2 K	
Trichloroethylene		2.K	2 K		10 K	2.K	2 K	2 K	
Chlorodibromomethane		2 K	2 K		10 K	2.K	2.K	2 K	
1,1,2-Trichloroethane		`.2 K	2 K		10 K	2K	.2 K	2 K	•
Benzene		24	0.00		27.0	2 K	20 X	2 K	
Trans-1,3-Dichloropropene		2 K	2.K		10 K	2 K	2 K	2 K	
2-Chloroethylvinyl Ether									
Bromoform		2 K	2 K		10 K	2 K	2.8	2.K	
4-Methyl-2-Pentanone (MIBK)		2 K	76		10 K	2 K	. 2K	2 K	
2-Hexanone (MBK)		. 2K	2		3 OF	2 K	2 K	2.K	
Tetrachloroethylene		2 K	2 K		5 X	2 K	2 K	2.K	
1,1,2,2-Tetrachloroethane		2 K	2 K		10 K	2 K	2 K	2.K	
Toluene		2 K	8		260	2 K	2 K	2 K	
a		2.8	4		10 K	2.K	2.K	2 K	
Efhylbenzene		2 K	7.4		91.	2 K	2.K	2 K	
Styrene		2 K	2 K		95	2 K	2 K	.2 K	
Xylene		2 K	38		370	2 K	2 K	2 K	

K = Actual Value Not Known, but known to be le J = Estimated Value

	,						
Well	G24D - A	G24D - B	G26D	G11B	G13B	G105B	G130B
Unit	Lower Sand	Lower Sand	Lower Sand	Bedrock	Bedrock	Bedrock	Bedrock
TOC Elevation (ft ms/)	600.92	600.92	594.13	590.92	593.1	593.24	599.48
Total Depth (ft)			40	101	115	102	118
Water Level (ft below TOC)	6.6	9.9	11.75	5	81.1	36.9	78.7
Water Column Height (ft)			28.25	91	33.9	65.1	39.3
PiD Reading (ppm)	0	0	0	0	0	0	0
Sample Date	31-Jul	31-Jul	31-Jul	31-Jui		31-Jul	
Sample Time	14:43	15:03	8:45	8:15		15:00	-
Notes	Free Product	Free Product			NO SAMPLE	Incomplete	NO SAMPLE
	Paxton I	Paxton !	Paxton I	Paxton II	Paxton II	Paxton II	Paxton II
Severn Trent Services							
Tannin/ Lignín (mg/l) (LC06/LC02/LC11)							
Chemical Oxygen Demand (COD) (mg/L)	17000		340			. 029	
Organochlorine Pesticide Analysis (ug/L)							
beta-BHC	100 U		0.024 U	0.027 U			
delta-BHC	100 U		0.024 U	0.027 U			
Endosulfan i	100 U		0.024 U	U 720.0			
Endosulfan II	200 U		0.048 U	U.055 U			
Endosulfan sulfate	200 U		0.048 U	0.055U			
Methoxychior	1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 TO 1000 T		0.24 U	0.27 U			
Endrin aldehyde	200 U		0.048 U	0.055U			
Endrin ketone	200 U		0.048 ∪	0.055U			
SVOCs (ug/L)	,						
1,2-Diphenylhydrazine	5000 U		9.5 U				
n-Nitrosodiphenylamine	5000 U		9.5 U				
Benzidine	U 00003		95 U				
1,4-Dioxane	20000 U		38 U				
n-Nitrosodiethylamine	10000 U	•	19 U				
VOCs (ug/L)							
Acrolein	2000000 U	20000001	2001			200 U	の場合の関係を
Acetonitrile	400000 10	400000 U	40 U			40 U	
2-Chloroethyivinylether	n 0000s	20000 U	2 U			2.0 U	
1,3-Butadiene	50000 U	10000 U	10			1.0 U	

Page 19 of 24

Unit		Louis Cond					
	Lower Sand	LUME: CALL	Lower Sand	Bedrock	Bedrock	Bedrock	Bedrock
TOC Elevation (ft msl)	600.92	600.92	594.13	590.92	593.1	593.24	599.48
Total Depth (ft)			40	101	115	102	118
Water Level (ft below TOC)	6.6	6.6	11.75	10	81.1	36.9	78.7
Water Column Height (ft)			28.25	91	33.9	65.1	39.3
PID Reading (ppm)	ъ	0	0	0	0	0	0
VOC TIC (ug/L)							
Benzene, 1-ethyl-2-methyl-						,	
U - Analyte was not detected at or above the sta			,				
M - Manually integrated compound.							
IEPA - INORGANICS							
ph - lab, >2 Hours	7.2		8				
Fluoride, Total mg/L	0.43	,	0.52				
Sulfate, Total mg/L	-						
Ammonia - N, Total mg/L	800		16				
Phosphate - O AS PO4 mg/L			0.47				
Orthophosphate							
BOD 5 DAY mg/L	1180		32				
Kjeldahl-N, Total mg/L	1080		55				
Chromium, Hex ug/L	50K		20K				10.88
Magnesium, T mg/L	360		83				
Mercury, Tug/L			0.10K				
Potassium, T mg/L	550		23				
Antimony, T ug/L	Sept. 250		14K				
Barium, Tug/L	780		300				
Beryllium, T ug/L	1.0K		1.0K				
Chromium, T _, ug/L	000115		12			,	
Cobalt, Tug/L	22		7.3				
Lead, Tug/L	26.0		31				
Nickel, Tug/L	170		18				
Silver, T ug/L	5.0K		5.0K				新聞報酬等
Thellium, T ug/l.	¥10.8		The second	in the second			
Zinc, T ug/L	1900		110				
TDS @1800 (ROE) mg/L	8830		1470				医三角囊肿 化苯基
Chloride, Total mg/L	100 Sec. 200 Online		100 E	erne.			
Nitrate & NO2 - Ntotal mg/L	0.42		0.31				
Phosphorous - P, Total mg/L	2.01		0.93				
Cyanide, T mg/L	0.01		0.02				
Solids, TÓT, SUS, Mg/L	4790		196				
Oil, Grayimetric mg/L	200		5.5				

		-					
Well	G24D - A	G24D - B	G26D	G11B	G13B	G105B	G130
Unit	Lower Sand	Lower Sand	Lower Sand	Bedrock	Bedrock	Bedrock	Bedro
TOC Elevation (ft ms!)	600.92	600.92	594.13	590,92	593.1	593.24	599.4
Total Depth (ft)			40	101	115	. 102	118
Water Level (if below TOC)	6.6	6.6	11.75	10	81.1	36.9	78.7
Water Column Height (ft)	:		28.25	16	33.9	65.1	39.3
PID Reading (ppm)	o	0	•	0		Ф	O
	•						
Calcium, T mg/L	260		120	,			
Sodium, T mg/L	34000		4403				
Alumimum, T ug/L	11000		5700			***************************************	
Arsenic, Tug/L.	10K		10K				
Boron, Tug/L	\$006C		240000				
Cadmium, Tug/L	9 3		5.0K				
Copper, Tug/L	. 150		16				
Iron, Tug/L	300076		20000				
Manganese, T ug/L	1000		270				
Selenium, T ug/L	30K		30K			٠	
Strontium, T ug/L	1400		4100				
Vanadium, T ⊍g/L	37		12				
IEPA - SVOCs/VOCs/Pest (ug/L)							
Hexachlorobenzene	1500 K	2.0 K	0.01 K	0.01 K			
Trifluralin	3000 K	က	0.01 K	0.01 K		,	
Alpha-BHC	1500 K	2.0 K	0.01 K	0.01 K			
Gamma-BHC (Lindane)	1500 K	2.0 K	0.01 K	0.01 K			
Atrazine	15000 K	20 K	0.1 K	0.1 K			
Heptachlor	1500 K	2.0 K	0.01 K	0.01 K			
Aldrin	1500 K	2.0 K	0.01 K	0.01 K			
Acetochlor	7500 K	20 K	0.1 K	0.1 K			
Alachlor	3000 K	4.0 K	0.02 K	0.02 K			
Metribuzin	3000 K	10 K	0.05 K	0.05 K			
Metolachlor	7500 K	20 K	. 0.1 K	0.1 K			
Heptachlor Epoxide	1500 K	2,0 K	0.01 K	0.01 K			
Pendimethalin	3000 K	+0 X	0.05 K	0.05 K			
Gamma-Chiordane	3000 K	2.0.K	0.01 K	0.01 K			
Alpha-Chlordane	3000 K	2.0 K	0.01 K	0.01 K			
Total Alpha and Gamma Chlordane	1500 K	20 K	0,1 K	0.1 K			
Dietdrin	1500 K	2.0 K	0.01 K	0.01 K			
Captan	3000 K	10 K	0.05 KJ	0.05 K		,	
Cyanazine	7500 K	20 K	0.1 K	0.1 K			
Endrin	1500 K	2.0 K	0.01 K	.01 K		,	
P,P'-00E		2.0 K	0.01 K	0.01 K			
Q00d'd	1500 K		0.01 K	0.01 K			

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nol 140K 30KJ	2.4 KJ 1.5 K		
2-methylnaphthalene	2.4 KJ 1.5 K		
Hexachlorocyclopentaciene 30 KJ 2.4 KJ	2.4 KJ	特殊要別終後報 例	
2,4,6-Trichlorophenol 2.4 KJ 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
2,4,5-Trichlorophenol 2.4 KJ 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
2-chloronaphthalene 140 K 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
2-Nitroaniline . 2.4 KJ 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
e 140K 30KJ	2.4 KJ 1.5 K	35.25	
Acenaphthylene 140'K 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
2,6-Dinitrotoluene 140 K 30 KJ 2.4 KJ	2.4 KJ 1.5 K		
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Well	G24D - A	G24D - B	G26D	G11B	G13B	G105B	G130B
Unit	Lower Sand	Lower Sand	Lower Sand	Bedrock	Bedrack	Bedrock	Bedrock
TOC Elevation (ft ms.)	600.92	600.92	594.13	590.92	593.1	593.24	599 48
Total Depth (ft)			40	5	115	102	118
Water Level (ft below TOC)	6.6	6.6	11.75	5	81.1	36.9	78.7
Water Column Height (ft)			28.25	9	33.9	65.1	39.3
PID Reading (ppm)	0	0	\$ 0 pr	o	0	0	.0
3-Nitroaniline	140 K	30 KJ	2.4 KJ	1.5K			
Acenaphthene	140 K	30 KJ	2.4 KJ	1.5 K			
2,4-Dinitrophenol		100 KJ					
4-Nitrophenol	140 K	30 KJ	2.4 KJ	1.5 K			
Dibenzofuran	280	· 650 J	2.4 KJ	1.5 K			
2,4-Dinitorroluene	140 K	30 KJ	2.4 KJ	1.5 K			
Diethylphthalate	140 K	30 KJ	2.4 KJ	1.5 K			
4-chlorophenyl-Phenyl Ether	. 340 K	30 KJ	2.4 KJ	1.5 K			
Fluorene	710		2.4 KJ	1.5 K			
4-Nitroanline	140 K	30 KJ	2.4 KJ	1.5 K			
4,6-Dinitro-2-Methylphenol		30 KJ		1.5 K			
4-Bromophenyi Phenyi Ether	140 K	30 KJ	2,4 KJ	1.5 K			
Hexachlorobenzene	140 K	30 KJ	2.4 KJ	1.5 K			
Pentachlorophenol	140 K	100 KJ		1.5 K			
Phenanthrene	1800	4600 J	2.4 KJ	1.5 K			
Anthracene	140 K	220 J	2.4 KJ	1.5 K			
Di-N-Butylphthlate	140 K	30 KJ	2.4 KJ	1.5 K			
Fluoranthene	140 K	190 J	2.4 KJ	1.5 K			
Pyrene	200	390 J	2.4 KJ	1.5 K			
Butyl Benzyl Phthalate	140 K	45 J	2.4 KJ	1.5 K			
3,3'-Dichlorobenzidine	140 K	30 KJ	2.4 KJ	1.5 K			
Benzo(a)anthracene	140 K		2.4 KJ	1.5 K			
Chrysene	140 K	2000	2,4 KJ	1.5 K			
Bis(2-Ethylhexyl)Phthalate	< 10.0		2.4 KJ	1.5 K			
Di-N-Octylphthalate	510	940 J	2.4 KJ	1.5 K			
Benzo(B)Fluoranthene	140 K	100 m (100) - 300 m	2.4 KJ	1.5 K		,	
Benzo(K)Fluoranthene	140 K	30 KJ	2.4 KJ	1.5 K			
Benzo(A)Pyrene	140 K		2.4 KJ	1.5 K			
Indeno(1,2,3-CD)Pyrenë	140 K	30 KJ	2.4 KJ	1.5 K			
Dibenzo(AH)Anthracenie	140 K	30 KJ	2.4 KJ	1.5 K	100 March 100 Ma		
Benzo(GHi)Perylene	740 X	30 KJ	2.4 KJ	1.5 K		•	
Chloromethane	10 K	. 2K	2 K	2 K		2 K	
Bromomethane	10 K	2K	2 K	2 KJ		2 K	
Vinyl Chloride	10 K	2 X	2.K	2 K		2.K	
Chloroethane	10 K	2 K	2.K	2 K		2 K	
Methylene Chloride	25 K	5 K	5.KJ	5 K		2 K	

Well	G24D - A	G24D - B	G26D	G11B	G13B	G105B	G130B
Unit	Lower Sand	Lower Sand	Lower Sand	Bedrock	Bedrock	Bedrock	Bedrock
TOC Elevation (ft msl)	600.92	600.92	594.13	590.92	593.1	593.24	599,48
Total Depth (ft)		٠,	.40	101	115	102	118
Water Level (ft below TOC)	6.6	6.6	11.75	0	81.1	36.9	78.7
Water Column Heighl (ft)			28.25	93	33.9	65.1	39.3
PID Reading (ppm)	0	0	0	0	0	0	0
Acetone		16	10 K ·	20		13 #	
Trichlorofluoromethane	· 10 K	2 K	2 K	2 K		2 K	
Bromochloromethane	10 K	2 KJ	2 KJ	2.K		2 X K	
Carbon Disulfide	10 K	2 K	2 K	2 K		2 7	
1,1-Dichloroethylene	10 K	2 K	2 K	2 K		2 X	
1,1-Dichloroethane	10 K	2 K	2 KJ	2 K		2 7	
Trans-1,2-Dichloroethylene	10 K	2.K	2 K	2 K		2 K	
Cis-1,2-Dichloroethylene	10 K	2 K	2 K	2 K		2 X	
Chloroform	10 K	2 K	2 KJ	2.¥		77 X	
1,2-Dichloroethane	10 K	21/3	2 K	2 ¥		24 XX	
2-Butanone(MEK)		•	かスト	5.2			
1,1,1-Trichloroethane	10 K	2 K	2 KJ ·	2 X		2 X	
Carbon Tetrachloride	10 K	2 KJ	2 K	2 K		2 K	
Methyl Tent-Butyl Ether	10 K	2 K	2.K	2 K		2 K	
Dichlorobromomethane	10 K	2 K	2.K	2 X		2 K	
1,2-Dichloropropoane	10 K	2.K	2 K	. 2 K		2 K	
Cis-1,3-Dichloropropene	10 K	2.K	2 K	2 K		2 X	
Trichtoroethylene	10 K	2 KJ	2 K	2 K		2.K	
Chlorodibromomethane	10 K	2K	2 K	2.K		2 K	
1,1,2-Trichloroethane	10 K	2 KJ	2 K	2 K		. 2K	
Benzene			2 K	2 K		2 K	
Trans-1,3-Dichloropropene	10 K	2 KJ	2 K	2 K		2 K	
2-Chloroethylvinyl Ether			-				
Bromoform	10 K	2K	2 K	2 K		2 K	
4-Methyl-2-Pentanone (MIBK)	10 K	2 K	2 K	2 K		.2 K	
2-Hexanone (MBK)	10 K	2K	2 K	2 K		2 K	
Tetrachloroethylene	10 K	2 KJ	2 K	2 K		2 K	
1,1,2,2-Tetrachloroethane	10 K	2K	2 K	2 K		2 K	
Î	10 K	6.4 J	2 K	2 K		2 K	
Chlorobenzene	10 K	9.9 J	2 K	2 K		2 K	
Ethylbenzene	33	.190 J	2 K	2 K		2 K	
Styrene	10 K	2 KJ	2 K	2 K		2 K	
Xylene	190	200 J	2 K	2 K		2 K.	

K = Actual Value Not Known, but known to be le J = Estimated Value



 Table 3-2
 Analytical Detections and Screening Criteria for Groundwater Samples

	Sc	reening Crit	eria														
Analyte	MCL	1	TACO Class II	LC05	LC06	LC06D	G104	LC12	LC11	LC11D	LC03	E	G20S	LC02	R21S	R21D	G21S
Volatile Organic Compoun	ds (µg/L)							·									
1,1-Dichloroethane	NS	700	3500	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	1.1	ND	ND
1,2-Dichlorobenzene	NS	600	1500	ND	1.2	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NS	NS	NS	ND	1.0	ND	ND	7.9	ND	ND	ND	ND	ND	ND	ND	2.2	ND
1,3,5-Trimethylbenzene	NS	NS	NS	ND	ND	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	NS	75	375	ND	ND	ND	ND	2.6	ND	ND	ND	ND	ND	ND	ND	ND	1
4-Methyl-2-pentanone (MIBK)	NS	NS	NS	ND	ND	ND	ND	36	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NS	6300	6300	ND	ND	ND	ND	110	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	5	25	ND	14 MI	12 MI	ND	27 MII	7.7 MI	8.1 MI	ND	ND	ND	ND	2.3	0.96 J	3.2
Carbon disulfide	NS	700	3500	ND	ND	ND	ND	1.9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	100	100	500	ND	6.4	6.2	ND	3.3	3.1	3.2	2.8	ND	ND	ND	9.3	ND	8.2
Chloroethane	NS	2800*	14000*	ND	ND	ND	ND	ND	ND	ND	9.9	ND	ND	ND	ND	6.4	ND
cis-1,2-Dichloroethene	70	70	200	ND	ND	ND	ND	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	1400*	7000*	ND	ND	ND	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	700	1000	ND	ND	ND	ND	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	ND	4.5	4.4	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylene	NS	NS	NS	ND	ND	ND	ND	23	ND	ND	ND	ND	ND	ND	ND	2.2	ND
Methylene chloride	5	5	50	ND	ND	ND	ND	5.6 MI	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NS	140	220	ND	4.6	4.5	ND	26	ND	ND	ND	ND	ND	ND	ND	1.5	ND
n-Butylbenzene	NS	NS	NS	ND	2.6	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Propylbenzene	NS	NS	NS	ND	6.3	6.5	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	NS	NS	NS	ND	ND	ND	ND	7.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NS	NS	NS	ND	2.6	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1000	1000	2500	ND	ND	ND	ND	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	2	10	ND	ND	ND	ND	5.2 MI	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	10000	10000	10000	ND	ND	ND	ND	30	ND	ND	ND	ND	ND	ND	ND	2.2	ND
Semivolatile Organic Com	pounds (µg/	L)	1						T	T	T	T	Г	Г	T		
1,3-Dichlorobenzene	NS	6.3*	31.5*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.53 J
1,4-Dichlorobenzene	NS	75	375	ND	ND	ND	ND	1.8 J	0.65 J	0.78 J	0.41 J	ND	ND	ND	0.81 J	ND	0.86 J
2,4-Dimethylphenol	NS	140	140	ND	ND	ND	ND	9.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	NS	28*	140*	ND	15	15	ND	9.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	NS	350	350	ND	ND	ND	ND	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	NS	NS	NS	ND	ND	ND	ND	37	ND	ND	ND	ND	0.69 J	ND	ND	ND	ND
Acenaphthene	NS	420	2100	ND	0.76 J	0.62 J	ND	1.0	0.5 J	0.55 J	2.9	ND	ND	0.52 J	0.64 J	ND	0.52 J
Anthracene	NS	2100	10500	ND	ND	ND	ND	0.52 J	ND	ND	0.19 J	ND	ND NB	ND	ND	ND	ND
Benzo(a)anthracene	NS	0.13	0.65	ND	ND	ND ND	ND	0.14 J I	0.14 J	0.14 J I	ND ND	ND	ND ND	ND	ND	ND ND	ND ND
Benzo(b)fluoranthene	NS NS	0.18 NS	0.9	ND	ND	ND	ND ND	ND 1.6 J	ND ND	0.13 J	ND ND	ND ND	ND ND	ND ND	ND 2.6 J	ND ND	ND ND
Carbazole	NS NS	1.5	NS 7.5	ND ND	ND ND	ND ND	ND ND	0.12 J	0.1 J	0.12 J	ND ND	ND ND	ND ND	ND ND	ND	ND ND	ND ND
Chrysene Dibenzofuran	NS NS	28*	140*	ND ND	ND	ND ND	ND	0.12 J	ND	0.12 J	ND	ND ND	ND ND	0.27 J	ND	ND ND	ND ND
Fluoranthene	NS	280	1400	ND	ND	ND ND	ND	0.38 J	ND	ND	0.33 J	ND	ND	0.27 3 ND	ND	ND ND	ND ND
Fluorene	NS	280	1400	ND	1.4 J	1.6 J	ND	0.41 J	ND ND	ND ND	0.73 J	ND	ND ND	0.52 J	ND	ND ND	ND ND
Naphthalene	NS	140	220	ND	4.1 J	4 J	ND	16	ND	ND	0.17 J	ND	ND ND	0.65 J	ND	ND	ND ND
Phenanthrene	NS	210*	1050*	ND	1.4 J	1.5 J	ND	2.1	ND ND	ND	ND	ND	ND ND	ND	ND	ND	ND ND
Phenol	NS	100	100	ND	ND	ND	ND	55	ND ND	ND ND	ND	ND ND	ND ND	ND	ND ND	ND ND	ND
Pyrene	NS	210	1050	ND	ND	ND ND	ND	0.33 J	ND	ND	0.21 J	ND	ND	ND	ND ND	ND	ND
Inorganics (mg/L)					1			1	1			1	· · · -				
	0.006	0.006	0.024	ND	ND	ND	ND	ND	ND	ND	0.0031 JB	ND	ND	ND	0.0056 JB	0.0076 JB M	ND
Antimony Arsenic	0.006	0.006	0.024	0.0026 J	ND ND	ND ND	0.0095 J	ND ND	ND ND	ND ND	0.0031 JB ND	ND ND	0.014 M		0.0056 JB ND	0.0076 JB M	ND ND
Arsenic Barium	0.010	2	2	0.0026 J 0.099	0.65	0.65	2.3 M		0.48	0.5	0.59	0.038	0.014 M	0.0022 J 0.86	0.7	0.6	1.1
Beryllium	0.004	0.004	0.5	ND	ND	0.63 ND	ND ND	ND	0.48 ND	ND	0.003 J	0.038 ND	0.34 ND	0.86 ND	ND	ND	0.00016 J
Cadmium	0.004	0.004	0.05	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	0.0003 J	ND ND	ND ND	ND ND	ND ND	ND ND	0.00016 J
Chromium	0.005	0.005	1	0.026	0.0042 J	0.48 J MI		0.0016 J	0.0039 J	0.0035 J	0.0044 J	0.0069 J	0.011	0.0078 J	0.0053 J	0.0037 J	0.00049 J
Chlomium	V. 1	U. 1		0.020	0.0042 U	U.40 J IVII	0.024	0.0010 0	0.0009	0.0000	U.UUTT J	0.0003 0	0.011	0.0010 J	0.0000	0.0001	U.0032 J

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Copper	1.3	0.65	0.65	0.11	ND	ND	ND	ND	ND	ND	ND	0.0066 J	ND	ND	ND	ND	ND
Lead	0.015	0.0075	0.1	0.0071	ND	ND	ND	ND	ND	ND	ND	0.0027 J	ND	ND	ND	ND	ND
Mercury	0.002	0.002	0.01	0.29 MII	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	NS	0.1	2	0.097	0.0069 J	0.0073 J	0.072	0.030	0.0066 J	0.0065 J	0.015	0.027	1.2 I	0.2	I 0.013	0.011	0.012
Selenium	0.05	0.05	0.05	ND	ND	ND	ND	ND	ND	ND	0.0044 J	ND	ND	ND	ND	ND	0.0048 J
Silver	0.1	0.05	NS	0.0011 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	NS	1200**	1200**	550 B	390 B	390 B	1300	II 640 B	430 B	430 B	260 B	65 B	1300 B II	860 B	300 B	280 B	280 B
Zinc	NS	5	10	0.044	ND	0.0069 J	ND	ND	ND	ND	0.0088 J	0.014 J	ND	ND	ND	ND	ND
* Illinois EPA-suggested groun	ndwater remedi	ation objective	s for chemicals	not listed in TACO			Note: Shading	indicates an analytical v	alue that exceeds o	ne or more screenin	g levels.						

^{*} Illinois EPA-suggested groundwater remediation objectives for chemicals not listed in TACO.
** Included in total disolved solids pursuant to 35 IAC 620.

ND = Not detected above the minimum detection limit

NS = Not specified.

J = Estimated.

B = Result is less than reporting limit, but above the minimum detection limit.

μg/L = Micrograms per liter. mg/L = Milligrams per liter.

MCL = Maximum Contaminant Level. TACO = Tiered Approach to Corrective Action Objectives.

M = Exceeds MCL. I = Exceeds TACO Class I. II = Exceeds TACO Classes I and II.

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SEDIMENT SAMPLING RESULTS - 1999 INDIAN RIDGE MARSH

Chemical	COSR Ecotox	COSR Ecotox	COSR Ecotox												
	Background	Threshold	Benchmark	SD-1 ^a	SD-2 ^a	SD-3 ^a	SD-4 ^a	SD-5 ^a	SD-6 ^a	SD-7 ^a	SD-8 ^a	SD-9 ^a	SD-10 ^a	SD-11 ^a	SD-20 ^a
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metals															
Aluminum	15,000	NA	NA	7,180	8,300	6,340	6,480	6,850	8,050	8,760	8,340	13,300	7,390	11,300	19,200
Antimony	0.8	3.2	70	12.4	ND	ND	4.8	6.1	ND	ND	ND	ND	ND	ND	NE
Arsenic	26.4	9.79	33	11.9	ND	11.8	10.7	10	10.6	ND	6.4	6.8	10.3	6.2	29.6
Barium	213	NA	NA	109	124	108	96.8	105	131	115	71.8	68	87.6	71.9	374
Berylium	1.5	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cadmium	3.7	0.99	4.98	2.4	3.2	1.9	1.6	2.2	3.2	3.4	2.2	0.6	5.8	1.5	3.2
Chromium	69.9	43.4	111	67.3	67.1	36.9	ND	ND	37.9	ND	ND	ND	37.6	ND	64.3
Cobalt	17.2	NA	NA	10.1	11.3	10.4	9.8	10.8	10.7	14	11.7	15	12.7	12.8	13.8
Copper	99.9	31.6	149	84.8	91.9	54.5	55.4	57.6	68.1	59.9	46.1	51.6	67.9	57.9	131
Iron	41,600	21,200	43,766	34,700	40,900	31,400	32,000	31,100	31,600	28,000	22,700	27,600	35,600	24,100	43,600
Lead	538	35.8	128	205	237	119	97.2	108	148	95.8	71.8	65.8	155	132	539
Manganese	1,810	460	1,100	1,020	919	1,110	1,000	1,190	1,670	1,370	890	692	1,350	786	365
Mercury	0.47	0.18	1.06	ND	ND	0.9	ND	ND	ND	ND	ND	ND	ND	ND	0.9
Nickel	49.2	22.7	48.6	32.4	34.6	28.3	27.9	30.1	29.2	32.2	29.6	42.8	33.2	39.4	49.8
Selenium	5.03	4	4	ND	ND	ND	ND	ND	3.1	ND	2.4	ND	4.2	ND	8.7
Silver	0.64	1	3.7	ND	ND	ND	ND	ND	ND	2.7	ND	ND	2.7	ND	
Thallium	1.1	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vanadium	56.3	NA	NA	27.8	28.2	27.5	25.6	28.2	23.9	21.5	21.5	30.4	25.5	32.4	73.1
Zinc	761	121	459	1,060	1,190	795	798	1,200	597	1,160	759	195	1,170	437	986
Organics															
Pesticides															
DDD	1,250	0.013	0.16	0.183	0.329	0.086	0.079	0.082	0.14	0.078		0.024	ND	0.131	0.204
DDE	140	0.008	0.08	ND	ND	ND	0.052	0.046	0.043	0.032	0.027	0.0083	ND	0.01	0.02
DDT	75	0.010	0.08	0.056	0.144	0.023	0.0174	ND	ND	ND	ND	ND	ND	0.01	NE
Aldrin	NA	NA	NA	0.012	0.024	0.015	0.015	0.018	ND	ND	ND	ND	ND	ND	NE
delta-BHC	NA	NA	NA	ND	ND	ND	0.017	ND	0.0066	ND	ND	ND	ND	ND	
Dieldrin	NA	0.005	0.16	ND	ND	ND	0.023	0.022	0.02	0.016	0.008	0.01	0.064	ND	
Endosulfan I	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.042	ND	NE
Endosulfan II	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.298	ND	NE
Endosulfan sulfate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025	ND	NE
Endrin	NA	0.005	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025	NE
PAHs															
Acenaphthene	100	0.03	0.34	ND	ND	ND	ND	ND	ND	ND	ND	0.066	0.19	0.11	NE
Acenaphthylene	100	0.03	0.34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Anthracene	1,060	0.16	2.21	0.31	ND	ND	0.21	0.23	0.16	0.16	0.12	0.141	0.61	0.17	NE
Benzo(a)anthracene	2,910	0.29	2.74	1.2	0.83	0.41	0.71	0.61	0.54	0.43	0.4	0.47	1.3	0.44	0.21
Benzo(a)pyrene	2,990	0.39	3.78	1.3	0.99	0.48	0.81	0.64	0.6	0.52	0.45	0.48	1.5	0.43	0.22
Benzo(b)fluoranthene	2,690	26.05	NA	2.3	1.6	0.68	1.4	1	0.98	0.83	0.76	0.77	2.5	0.7	0.31
Benzo(g,h,i)perlyene	2,200	0.44	8.34	0.6	0.43	1.9	310	0.28	0.31	0.21	0.17	0.18	0.51	0.44	NE
Benzo(k)fluoranthene	NA	0.63	34.91	0.63	0.56	0.43	0.54	0.41	0.38	0.4	0.27	0.34	0.83	0.24	0.12
Chrysene	3,760	0.44	3.36	1.5	1.1	0.62	0.91	0.65	0.73	0.52	0.43	0.58	1.7	0.55	0.27
Dibenzo(a,h)anthracene	691	0.08	0.36	0.26	ND	ND	ND	ND	0.12	ND	ND	0.078	0.28	0.16	NE
Fluoranthene	9,070	16.15	16.15	2.1	1.5	0.77	1.5	1.4	0.9	0.85	0.72	0.72	2.2	0.73	0.35
Fluorene	429	1.41	1.41	0.29	ND	ND	0.3	ND	0.16	0.23	0.17	0.11	0.55	0.13	NI
Indeno(1,2,3-cd)pyrene	3,480	0.52	5.21	0.63	0.46	0.21	0.32	0.31	0.31	0.24	0.2	0.21	0.63	0.38	0.1
Naphthalene	200	1.22	1.46	0.37	ND	ND	0.26	0.23	0.15	0.19	0.11	ND	0.97	0.36	NI
Phenanthrene	3,700	4.69	4.69	1.3	0.86	0.4	0.77	0.55	0.45	0.48	0.39	ND	1.6	0.91	0.25
Pyrene	7,700	0.52	3.96	1.9	1.4	0.72	1.1	0.87	1.1	0.69	0.62	0.73	2	0.72	0.34

^a Data source is Ecology and Environment (1999)

Calumet Open Space Reserve Not available COSR

NA ND Not detected

Italics Value above COSR Ecotox threshold

Bold Value above COSR Ecotox threshold and background (when background is greater than threshold)

Value above COSR Ecotox benchmark

TABLE 2

SURFACE WATER SAMPLING RESULTS - 1999 INDIAN RIDGE MARSH

Chemical	COSR Ecotox Background (mg/kg)	COSR Ecotox Threshold (ug/L)	COSR Ecotox Benchmark (ug/L)	SW-1 ^b (ug/L)	SW-2 ^b (ug/L)	SW-3 ^b (ug/L)	SW-4 ^b (ug/L)	SW-5 ^b (ug/L)	SW-6 ^b (ug/L)	SW-7 ^b (ug/L)	SW-8 ^b (ug/L)	SW-9 ^b (ug/L)	SW-10 ^b (ug/L)	SW-11 ^b (ug/L)	SW-20 ^b (ug/L)
Metals			210		1775	1775	0.4	3.775		1775	1775	1.775	_		
Arsenic	2.5	48	340	6.3	ND	ND	8.4	ND	5.3	ND	ND	ND	5	ND	98.5
Cadmium	<2	5.1	14.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27.4
Chromium	<8	184.7 ^a	1420.2 ^a	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	473
Cobalt	<4	24	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	45.8
Copper	5.1	23.2	36.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	952
Cyanide	<2	5.2	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	<2	16.7	318.2	ND	ND	2.7	ND	ND	4,940						
Manganese	42	1,000	1,000	573	588	683	521	480	502	494	586	652	900	698	5,070
Mercury	0.017	0.9	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8
Zinc	12	303.9	301.4	5	17.2	19.4	9.4	22.4	13.5	6	12.4	8.9	5.3	13.4	8,960

^a The value used is for Chromium III.

COSR Calumet Open Space Reserve

NA Not available ND Not detected

Italics Value above COSR Ecotox threshold

Bold Value above COSR Ecotox threshold and background (when background is greater than threshold)

Shaded Value above COSR Ecotox benchmark

^b Data source is Ecology and Environment (1999)

TABLE 3

GROUNDWATER SAMPLING RESULTS - 1999, 2000, 2001, AND 2007 INDIAN RIDGE MARSH

Chemical	COSR Ecotox Background (µg/L)	COSR Ecotox Threshold (µg/L)	COSR Ecotox Benchmark (µg/L)	LC-02 ^a (µg/L)	LC-03 ^a (μg/L)	LC-04 ^a (μg/L)	LC-05 ^a (μg/L)	LC-11 ^a (µg/L)	LC-12 ^a (µg/L)	LC-02 ^b (μg/L)	LC-03 ^b (μg/L)	LC-11 ^b (μg/L)	LC-12 ^b (µg/L)	G21S ^b (μg/L)	R21S ^b (μg/L)	SB-10 ^c (μg/L)	SB-11 ^c (μg/L)	SB-13 ^c (μg/L)	SB-22 ^c (μg/L)	SB-25 ^c (μg/L)	SB-29 ^c (μg/L)	SB-32 ^c (μg/L)	SB-43 ^c (μg/L)	SB-50 ^c (μg/L)
Metals	(1-8)	(P8)	(1-8)	(1-8)	(PB -)	(PB)	(118/)	(1-8)	(PB)	(P8)	(1-8)	(PB/-/	(P8/-/	(1-8)	(P8/-/	(PB -/	(100-1	(PB)	(1-8/-/	(P8 -)	(F8 -)	(PB//	(F8 =)	(P8/-/
Aluminum	NA	NA	NA	ND	ND	ND	59.8	ND	ND	NA	NA	NA	NA	NA	NA	ND	404	ND	ND	ND	ND	633	ND	8,460
Arsenic	2.5	48	340	ND	ND	ND	4.7	ND	ND	2.2	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND		
Barium	50	5,000	5,000	463	370	109	187	277	124	860	590	480	210	ND	700	215	55	96	ND	48	137	33	103	870
Cadmium	<2	5.1	14.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (3+/6+)	<8	184.7/11	1420.2/16	7.1	ND	ND	ND	ND	ND	7.8	4.4	3.9	1.6	3.2	5.3	ND	46							
Cobalt	<4	24	110	77.2	23.9	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	11	ND	11	ND	ND	ND	ND
Iron	710	1,000	1,000	6,960	9,690	101	123	189	615	NA	NA	NA	NA	ND	ND	157	1,430	673	490	530	286	1,410	251	16,000
Lead	<2	16.7	318.2	19.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	2,560
Manganese	42	1,000	1,000	916	312	627	434	67.8	173	NA	NA	NA	NA	NA	NA	1,110	284	3,650	983	1,820	1,190	404	1,480	1,800
Nickel	<20	133.6	1,203	119	ND	ND	ND	32.6	111	200	15	6.6	30	12	13	ND	ND	15	18	18	ND.	ND	15	30
Zinc	12	303.9	301.4	17.3	13.2	ND	ND	ND	ND	ND	8.8	ND	ND	ND	ND	53	ND	219	168	406	62	. 11	339	672
Cyanide	NA	5.2	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	178	29	ND	33	ND	139	ND	ND	ND
Organics																		•						
cis-1,2-Dichloroethene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0263
Ethylbenzene	NA	NA	NA	ND	ND	ND	ND	ND	8	ND	ND	ND	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0141
Toluene	NA	NA	NA	ND	ND	ND	ND	ND	3	ND	ND	ND	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vinyl chloride	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND	ND	ND		ND	ND	ND	
Xylenes(total)	NA	NA	NA	2	ND	1	ND	ND	5	ND	ND	ND	7.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0363
2-Methylnaphthalene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			ND	ND	
Benzo(a)anthracene	NA	0.03	0.2	2	2	ND	0.7	ND	2	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0015
Benzo(b)fluoranthene	NA	9.1	5.7	3	2	ND	ND	ND	2	ND	ND			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0004
Benzo(a)pyrene	NA	0.02	8.1	2	2	ND	0.5	ND	2	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0006
Benzo(k)fluoranthene	NA	1.3	90.7	2	2	ND	ND	ND	1	ND				ND	ND		ND	ND	ND			ND	ND	
Bis(2)ethylhexyl phthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND					ND			ND	ND	ND					
Dibenz(a,h)anthracene	NA	0.5	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0002
Di-n-octyl phthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND					
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND					
Fluorene	NA	19	336.8	ND	3	ND	0.7	ND	ND		ND			ND	ND		ND	ND	ND					
Indeno(1,2,3-cd)pyrene	NA	4.3	5	2	1	ND	ND	ND	0.7	ND	ND			ND	ND		ND	ND	ND					
Naphthlalene	NA	68	510	2	6	1	1	ND	8	ND	ND			ND	ND		ND	ND	ND					
Phenanthrene	NA	3.7	46	1	8	0.8	3	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.058

^a Data source is Ecology and Environment (1999)

COSR Calumet Open Space Reserve

Not available NA

ND Not detected

Italics Value above COSR Ecotox threshold

Bold Value above COSR Ecotox threshold and background (when background is greater than threshold) V+C20alue above COSR Ecotox benchmark

Shaded

^b Data source is Ecology and Environment (2007)

^c Data source is Harza Engineering Company (2001)

SEDIMENT SAMPLING RESULTS - 2000 AND 2001 INDIAN RIDGE MARSH

COSR Ecotox	COSR Ecotox	COSR Ecotox												
Background	Threshold	Benchmark	SB-01	SB-03 ^a	SD-01 ^a	SD-02 ^a	SD-03 ^a	SD-04 ^a	SD-05 ^a	SD-06 ^a	SD-07 ^a	SD-08 ^a	SD-09 ^a	SD-10 ^a
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
15,000	NA	NA	185	458	4,840	6,190	8,480	3,600	4,650	4,290	7,150	4,790	8,950	6,050
0.8	3.2	70	ND	ND	ND	ND	ND	ND	ND	ND	ND	86	ND	NE
26.4	9.79	33	0.096	0.783	12.3	10.6	5.76	14.1	9.22	7.12	7.19	119	16	13.3
213	NA	NA	3.59	9.15	77.5	125	48.3	86.3	136	92.8	63.6	221	120	173
1.5	NA	NA	ND	0.083	0.353	0.581	0.545	0.257	0.49	0.527	0.525	108	1.14	0.421
3.7	0.99	4.98	ND	ND	ND	3.1	1.08	ND	3.75	ND	ND	117	4.16	3.13
69.9	43.4	111	0.6	1.2	28.1	28.8	20.8	35.8	41.8	15.5	45.6	152	99.7	53.9
17.2	NA	NA	ND	ND	7.12	8.45	8.33	3.98	3.78	4.9	8.19	113	4.89	9.3
99.9	31.6	149	ND	1.01	65.6	74.4	34	62.5		35.1	56		104	78.6
NA	0.1	NA												NE
		- /							,	-, -,			, , , , ,	31,800
538	35.8	128	2.11	3.5	127	153	60.1	220	301	104	148	591	602	189
1,810	460	1,100	78.1	13	625	1,290	550	428	224	587	484	357	554	1,290
0.47	0.18	1.06	ND	ND	ND	0.234	0.171	0.271	0.412	ND	ND	0.569	0.358	0.368
49.2	22.7	48.6	0.953	1.32	23.8	22.7	23.5	20.8	39.4	13.6	33.4	136	40.4	27.5
5.03	4	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	111	ND	NI
0.64	1	3.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	52.7	ND	NI
1.1	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	108	ND	NI
56.3	NA	NA	1.22	2.99	26.2	22	18.9	27.3	31.3	17.9	24	138	50.3	26.1
761	121	459	7.04	20.8	788	906	260	588	926	357	393	1,190	701	879
1,250	0.013	0.16	ND	ND	ND	ND		ND		ND			0.709	NE
75	0.010	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.112	NE
														NE
/			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.343	NE
			ND	ND	ND	0.193	ND	0.567	ND	ND	0.228	0.621	1.28	0.293
, , , , ,			ND	ND	ND	ND	ND	0.642	ND	ND	0.319	0.474	1.45	0.147
			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.81	NE
2,200	0.44	8.34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.73	NE
NA	0.63	34.91	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.61	NE
3,760	0.44	3.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.81	NE
691	0.08	0.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.315	NE
9,070	16.15	16.15	ND	0.34	ND	0.373	0.076	0.79	0.385	ND	0.317	1.2	1.7	0.609
3,480	0.52	5.21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.577	NE
200	1.22	1.46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.268	NE
3,700	4.69	4.69	ND	ND	ND	0.158	ND	0.368	0.197	ND	0.148	0.587	0.915	0.228
7,700	0.52	3.96	ND	ND	0.031	ND	0.285	0.059	0.659	ND	0.283	0.839	1.37	0.443
	Background (mg/kg) 15,000 0.8 26.4 213 1.5 3.7 69.9 17.2 99.9 NA 41,600 538 1,810 0.47 49.2 5.03 0.64 1.1 56.3 761 1,250 75 100 1,060 2,910 2,990 2,200 NA 3,760 691 9,070 9,070 3,480 200 3,700	Background (mg/kg) Threshold (mg/kg) 15,000 NA 0.8 3.2 26.4 9.79 213 NA 1.5 NA 3.7 0.99 69.9 43.4 17.2 NA 99.9 31.6 NA 0.1 41,600 21,200 538 35.8 1,810 460 0.47 0.18 49.2 22.7 5.03 4 0.64 1 1.1 NA 56.3 NA 761 121 1,250 0.013 75 0.010 100 0.03 1,060 0.16 2,910 0.29 2,990 0.39 2,690 26.05 2,200 0.44 NA 0.63 3,760 0.44 NA 0.63 3	Background (mg/kg) Threshold (mg/kg) Benchmark (mg/kg) 15,000 NA NA 0.8 3.2 70 26.4 9.79 33 213 NA NA 1.5 NA NA 3.7 0.99 4.98 69.9 43.4 111 17.2 NA NA NA 0.1 NA NA 0.1 NA 1,416,00 21,200 43,766 538 35.8 128 1,810 460 1,100 0.47 0.18 1.06 49.2 22.7 48.6 5.03 4 4 0.64 1 3.7 1.1 NA NA 56.3 NA NA 761 121 459 1.250 0.013 0.16 75 0.010 0.08 100 0.03 0.34	Background (mg/kg) Threshold (mg/kg) Benchmark (mg/kg) SB-01 (mg/kg) 15,000 NA NA 185 0.8 3.2 70 ND 26.4 9.79 33 0.096 213 NA NA NA 1.5 NA NA NA 3.7 0.99 4.98 ND 69.9 43.4 111 0.6 17.2 NA NA NA 99.9 31.6 149 ND 14.600 21.200 43.766 879 538 35.8 128 2.11 1,810 460 1,100 78.1 0.47 0.18 1.06 ND 49.2 22.7 48.6 0.953 5.03 4 4 ND 1.1 NA NA NA 1.2 1.06 NA ND 56.3 NA NA NA ND	Background (mg/kg) Threshold (mg/kg) Benchmark (mg/kg) SB-01 (mg/kg) SB-03° (mg/kg) 15,000 NA NA 185 458 0.8 3.2 70 ND ND 26.4 9.79 33 0.096 0.783 213 NA NA 3.59 9.15 1.5 NA NA NA ND 0.083 3.7 0.99 4.98 ND ND ND 69.9 43.4 111 0.6 1.2 17.2 NA NA NA ND	Background (mg/kg)	Background (mg/kg)	Background	Background	Background	Background Threshold (mg/kg)	Benchmark Complex Co	Benchmark	Background Imreshold Imr

^a Data source is Harza Engineering Company (2001)

COSR Calumet Open Space Reserve

NA Not available
ND Not detected

Italics Value above COSR Ecotox threshold

Bold Value above COSR Ecotox threshold and background (when background is greater than threshold)

Shaded Value above COSR Ecotox benchmark

TABLE 5
SEDIMENT SAMPLING RESULTS - 2001
INDIAN RIDGE MARSH

	COSR Ecotox	COSR Ecotox	COSR Ecotox												
Chemical	Background	Threshold	Benchmark	S-04-12	S-04-6	S-05-12	S-05-6	S-06-12	S-06-12DUP	S-06-6	S-06-6DUP	S-07-12	S-07-6	S-08-12	S-08-6
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metals	15,000	27.4	N. 4	1							1				
Aluminum	15,000	NA	NA To	6,100	5,100	7,100	6,800	5,700	7,800	5,200	12,000	4,200	4,900	6,400	8,100
Antimony	0.8	3.2	70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NE
Arsenic	26.4	9.79	33	9.7	10	5.6	7.9	12	8.9	5	8.2	4.3	5.4	3.4	7.7
Barium	213	NA	NA	60	95	63	77	83	69	62	110	42	60	58	100
Berylium	1.5	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NE
Cadmium	3.7	0.99	4.98	0.89	2.2	ND	1.1	1	ND	ND	ND	ND	ND	ND	2.2
Chromium	69.9	43.4	111	10	16	14	18	20	23	18	35	13	16	12	18
Cobalt	17.2	NA	NA	4.7	4	8.1	6.3	7.6	8.8	5	10	4.9	5.2	5.5	4.8
Copper	99.9	31.6	149	18	32	19	26	33	26	18	34	12	17	11	25
Cyanide	NA	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NE
Iron	41,600	21,200	43,766	10,000	16,000	15,000	14,000	25,000	22,000	15,000	29,000	11,000	14,000	10,000	16,000
Lead	538	35.8	128	24	110	43	71	110	64	43	66	45	68	21	83
Manganese	1,810	460	1.100	110	290	390	200	530	760	610	1,000	410	470	130	190
Mercury	0.47	0.18	1.06	ND	0.075	ND	ND	0.087	ND	0.054	0.1	ND	ND		NE
Nickel	49.2	22.7	48.6	15	14	17	17	18	24	15	32	11	13		19
Selenium	5.03	4	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		NE
Silver	0.64	1	3.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		NE
Thallium	1.1	NA	NA	ND	ND	ND	ND ND	ND	ND	ND	ND ND	ND	ND ND	ND	NE
Vanadium	56.3	NA	NA	16	18	18	20	20	23	16	33	15	18	18	21
Zinc	761	121	459	60	250	88	170	320	160	130	250	120	170	58	
Organics	701	121	439	00	230	00	1/0	320	100	150	230	120	170	38	230
Pesticides															
DDD	1,250	0.013	0.16	ND	0.046	0.06	0.16	0.09	0.09	0.03	0.023	0.023	0.026	ND	0.047
DDE	140		0.16												
DDT	75	0.008	0.08	ND	0.013	0.019	0.031	0.03	0.026	0.019	0.019	0.011	0.12	ND	NE
	13	0.010	0.08	ND	ND	ND	0.016	0.006	ND	ND	ND	ND	ND	ND	NE
PAHs	100	0.02							1		1				
Acenaphthene	100	0.03	0.34	ND	ND	ND	0.092	ND	0.092	ND	ND	ND	ND		NE
Acenaphthylene	100	0.03	0.34	ND	ND	ND	ND	ND	0.12		ND		ND		NE
Anthracene	1,060	0.16	2.21	ND	ND	ND	0.083	ND	0.11	0.048	ND	ND	ND		NE
Benzo(a)anthracene	2,910	0.29	2.74	ND	0.22	ND	0.32	0.11	0.24	0.14	0.12	ND	ND		0.1
Benzo(a)pyrene	2,990	0.39	3.78	ND	0.22	0.048	0.47	0.15	0.27	0.14	0.13	ND	ND	ND	NE
Benzo(b)fluoranthene	2,690	26.05	NA	ND	0.23	0.043	0.47	0.12	0.3	0.14	0.14	ND	ND	ND	NE
Benzo(g,h,i)perlyene	2,200	0.44	8.34	ND	0.098	ND	0.19	0.068	0.11	0.055	ND	ND	ND	ND	NE
Benzo(k)fluoranthene	NA	0.63	34.91	ND	0.16	ND	0.37	0.098	0.23	0.11	0.1	ND	ND	ND	NE
Chrysene	3,760	0.44	3.36	ND	0.24	0.061	0.44	0.13	0.29	0.17	0.14	ND	ND	ND	NE
Dibenzo(a,h)anthracene	691	0.08	0.36	ND	ND	ND	0.094	ND	0.054	ND		ND	ND	ND	NE
Fluoranthene	9,070	16.15	16.15	0.46	0.27	0.093	0.42	0.17	0.54	0.28	0.24	0.11	0.1	ND	0.1
Fluorene	429	1.41	1.41	ND	ND	ND	ND	ND	0.13	0.043	ND	ND	ND	ND	NE
Indeno(1,2,3-cd)pyrene	3,480	0.52	5.21	ND	0.11	ND	0.2	0.075	0.12	0.063	ND	ND	ND	ND	NE
Naphthalene	200	1.22	1.46	ND	ND	0.17	0.93	0.053	0.24	ND	ND	ND	ND		NE
Phenanthrene	3,700	4.69	4.69	ND	0.16	0.082	0.39	0.055	0.36	0.12	0.1	ND	ND	ND	NE
Pyrene	7,700	0.52	3.96	ND ND	0.16	0.032	0.39	0.15	0.44	0.12	0.1	ND	ND	ND	NE

SEDIMENT SAMPLING RESULTS - 2001 INDIAN RIDGE MARSH

Chemical	COSR Ecotox Background	COSR Ecotox Threshold	COSR Ecotox Benchmark	S-09-12	S-09-12DUP	S-09-6	S-09-6DUP	S-10-12	S-10-6	S-11-12	S-11-6
Metals	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	15,000	NA	NA	9,100	8,500	10,000	21,000	6,200	4,800	13,000	12,000
Antimony	0.8	3.2	70	9,100 ND	8,500 ND	1.7	21,000 ND	0,200 ND	4,000	13,000	12,000 ND
Arsenic	26.4	9.79	33	3.3	2.1	11/	16	5.3	12	13	13
Barium	213	NA	NA	71	52	150	250	62	98	130	120
Berylium	1.5	NA NA	NA NA	ND	ND	ND	ND	ND	ND	1.5	ND
Cadmium	3.7	0.99	4.98	ND ND	ND ND	ND ND	ND ND	ND ND	2.4	1.3	2.1
Chromium	69.9	43.4	4.98	16	16	25	56	11	2.4	21	30
Cobalt	17.2	NA	NA	6.2	6	6.2	12	4.3	3.4	Q Q	9.8
Copper	99.9	31.6	149	14	11	36	76	17	48	21	31
Cyanide	NA	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Iron	41,600	21,200	43,766	13,000	12,000	21,000	42,000	12,000	13,000	20,000	21,000
Lead	538	35.8	128	21	12,000	110	230	21	13,000	20,000	92
Manganese	1,810	460	1,100	420	420	270	640	140	170	130	ND
Mercury	0.47	0.18	1,00	ND	ND	ND	ND	ND	ND	ND	ND ND
Nickel	49.2	22.7	48.6	15	14	23	46	12	15	25	27
Selenium	5.03	4	4	ND	ND	ND	ND	ND	ND	ND	ND
Silver	0.64	1	3.7	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
Thallium	1.1	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	56.3	NA	NA	24	24	30	61	19	20	31	33
Zinc	761	121	459	59	44	240	540	75	350	180	340
Organics			737	37		240	540	7.5	330	100	540
Pesticides											
DDD	1,250	0.013	0.16	ND	ND	0.081	0.082	0.046	0.13	0.028	0.07
DDE	140	0.008	0.08	ND	ND	0.011	0.027	0.13	0.011	0.07	0.013
DDT	75	0.010	0.08	ND	ND	0.12	ND	0.002	0.0074	ND	0.028
PAHs		0.010	0.00								
Acenaphthene	100	0.03	0.34	ND	ND	ND	ND	ND	ND	ND	0.19
Acenaphthylene	100	0.03	0.34	ND	ND	ND	ND	ND	ND	ND	0.26
Anthracene	1,060	0.16	2.21	ND	ND	ND	ND	ND	ND	ND	0.11
Benzo(a)anthracene	2,910	0.29	2.74	ND	ND	0.18	0.34	ND	0.17	0.12	0.39
Benzo(a)pyrene	2,990	0.39	3.78	ND	ND	0.24	0.49	ND	0.13	0.14	0.44
Benzo(b)fluoranthene	2,690	26.05	NA	ND	ND	0.2	0.46	ND	0.11	0.11	0.45
Benzo(g,h,i)perlyene	2,200	0.44	8.34	ND	ND	0.11	0.24	ND	2.73	0.059	0.19
Benzo(k)fluoranthene	NA	0.63	34.91	ND	ND	0.14	0.28	ND	0.1	0.12	0.31
Chrysene	3,760	0.44	3.36	ND	ND	0.22	0.44	ND	0.2	0.15	0.51
Dibenzo(a,h)anthracene	691	0.08	0.36	ND	ND	0.06	0.11	ND	ND	ND	0.095
Fluoranthene	9,070	16.15	16.15	ND	ND	0.21	0.48	ND	0.21	0.15	0.53
Fluorene	429	1.41	1.41	ND	ND	ND	ND	ND	ND	ND	0.089
Indeno(1,2,3-cd)pyrene	3,480	0.52	5.21	ND	ND	0.11	0.23	ND	0.063	0.061	0.2
Naphthalene	200	1.22	1.46	ND	ND	ND	ND	ND	0.268	0.34	33
Phenanthrene	3,700	4.69	4.69	ND	ND	0.15	0.31	ND	0.15	0.11	0.43
Pyrene	7,700	0.52	3.96	ND	ND	0.23	0.48	ND	0.22	0.16	0.55

^a Data source is MWH Americas (2002)

COSR Calumet Open Space Reserve

Not available Not detected

Italics

Value above COSR Ecotox threshold

Value above COSR Ecotox threshold and background (when background is greater than threshold)

Shaded Value above COSR Ecotox benchmark

SURFACE WATER SAMPLING RESULTS - 2000 INDIAN RIDGE MARSH

	gogn n	gogn n	gogn n												
Chemical	COSR Ecotox	COSR Ecotox Threshold	COSR Ecotox Benchmark	SB-01 ^a	SB-03 ^a	SW-01 ^a	SW-02a	SW-03 ^a	SW-04 ^a	SW-05 ^a	SW-06 ^a	SW-07 ^a	SW-08 ^a	SW-09 ^a	SW-10 ^a
Chemicai	Background (μg/L)	(μg/L)	βenchinark (μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)
Metals	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)
Aluminum	140	NA	NA	ND	ND	ND	ND	336	ND						
Antimony	<8	30	88	ND	ND	ND	ND	ND		ND	ND				
Arsenic	2.5	48	340	ND	ND	ND	ND			ND	ND				
Barium	50	5000	5000	44	107	51	83			79		73			
Berylium	<4	NA	NA	0.056	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	<2	5.1	14.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (3+/6+)	<8	184.7/11	1420.2/16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	<4	24	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	5.1	23.2	36.4	ND	64	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	<2	5.2	22	21	78	11	11	ND	ND	ND	ND	ND	ND	ND	ND
Iron	710	1000	1000	195	5,380	1,200	1,150	1,080	1,020	630	365	755	492	710	523
Lead	<2	16.7	318.2	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	42	1000	1000	0.899	1,650	1,020	1,460	1,040	1,670	1,080	567	877	956	2,550	412
Mercury	0.017	0.9	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	<20	133.6	1202.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	<2	5	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	<2	5	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	<2	10	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	<2	12	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10
Zinc	12	303.9	301.4	67	32	36	22	26	29	57	18	25	32	14	19
Organics					,				,		,				
Bis(2-ethylhexyl)phthalate	NA	NA	NA	ND	ND	ND	44.12	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perlyene	NA	7.6	13.2	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

^a Data source is Harza Engineering Company (2001)

COSR Calumet Open Space Reserve

Not available NA ND Not detected

Value above COSR Ecotox threshold Italics

Bold Value above COSR Ecotox threshold and background (when background is greater than threshold)

Value above COSR Ecotox benchmark

Shaded



Table 1 Indian Ridge Marsh Sediment Sampling Results April 2009

				I.	aboratory ID :	C9D090311002	C9D090311006
					nt Sample ID :	SD-02	SD-06
					ate Collected :	4/8/2009	4/8/2009
				D	ate Conecteu :	4/8/2009	4/6/2009
			T	ı			
			COSR	COSR Ecotox	COSR Ecotox		
Analyte	Test Method	Units	Background	Threshold	Benchmark		
Total Organic Carbon	EPA Lloyd Kahn	percent	NA	NA	NA	11.1	32.9
Polynuclear Aromatics	EFA Lloyd Kallii	percent	INA	NA	INA	11.1	32.9
Acenaphthene	SW8270C	mg/kg	0.12	1.3	1.3	0.47 J	ND
Acenaphthylene	SW8270C SW8270C	mg/kg	0.12	0.01	0.13	ND	ND ND
Anthracene	SW8270C	mg/kg	1.06	0.06	0.13	0.57 J	ND
Benzo(a)anthracene	SW8270C SW8270C		2.91	0.06	1.05	2.4	0.64 J
Benzo(a)pyrene	SW8270C SW8270C	mg/kg mg/kg	2.91	0.11	1.05	3.7	0.59 J
Benzo(b)fluoranthene	SW8270C SW8270C	mg/kg	2.69 2.20	10 0.17	NA 3.2	6.4 2.8	5.8 0.5 J
Benzo(g,h,i)perylene		mg/kg					
Benzo(k)fluoranthene	SW8270C	mg/kg	2.70	0.24	13.4	2.2	0.51 J
Carbazole	SW8270C	mg/kg	NA 2.76	NA 0.17	NA 1.20	0.27 J	ND
Chrysene	SW8270C	mg/kg	3.76	0.17	1.29	3.2	0.65 J
Dibenzo(a,h)anthracene	SW8270C	mg/kg	0.69	0.03	0.14	0.79 J	ND
Dibenzofuran	SW8270C	mg/kg	NA	NA	NA	0.33 J	ND
Diethyl phthalate	SW8270C	mg/kg	NA 0.07	NA	NA	ND	0.5 J
Fluoranthene Fluorene	SW8270C SW8270C	mg/kg mg/kg	9.07 0.43	6.2 0.54	6.2 0.54	3.1 0.4 J	0.9 J ND
Indeno(1,2,3-c,d)pyrene	SW8270C SW8270C	mg/kg	3.48	0.34	2	2.1	0.37 J
2-Methylnaphthalene	SW8270C	mg/kg	NA	NA	NA	0.61 J	ND
Naphthalene	SW8270C	mg/kg	0.20	0.47	0.56	0.9 J	ND
Phenanthrene	SW8270C	mg/kg	3.70	1.8	1.8	2.1	0.46 J
Pyrene	SW8270C	mg/kg	7.77	0.2	1.52	3.1	0.77 J
Pesticides/PCBs							
Chlordane	SW8081A	mg/kg	0.004	0.003	0.02	ND	ND
4,4´-DDD	SW8081A	mg/kg	1.25	0.005	0.06	0.97	ND
4,4´-DDE	SW8081A	mg/kg	0.14	0.003	0.03	ND	ND
4,4´-DDT	SW8081A	mg/kg	0.75	0.004	0.03	ND	ND
Dieldrin	SW8081A	mg/kg	NA	0.002	0.06	ND	ND
Endrin	SW8081A	mg/kg	NA	0.002	0.02	ND	ND
Heptachlor	SW8081A	mg/kg	0.00001	0.002	0.02	ND	ND
Heptachlor epoxide	SW8081A	mg/kg	NA	0.002	0.02	ND	ND
PCBs	SW8082	mg/kg	0.134	0.06	0.68	ND	ND
Metals							
Antimony	SW6010B	mg/kg	0.8	3.2	70	4.5	1.2 J
Arsenic	SW6010B	mg/kg	26.4	9.79	33	34.9	8.8
Beryllium	SW6010B	mg/kg	1.5	NA	NA	1.9	0.91 U
Cadmium	SW6010B	mg/kg	3.7	0.99	4.98	9	2.1
Chromium	SW6010B	mg/kg	69.9	43.4	111	157	36.8
Copper	SW6010B	mg/kg	99.9	31.6	149	182	57.2
Lead	SW6010B	mg/kg	538	35.8	128	689	131
Mercury	SW7471A	mg/kg	0.47	0.18	1.06	0.71 J	0.31 J
Nickel	SW6010B	mg/kg	49.2	22.7	48.6	62.4	22.4
Selenium	SW6010B	mg/kg	5.03	4	4	3.2	1.7
Silver	SW6010B	mg/kg	0.64	1	3.7	3.2	1.1
Thallium	SW6010B	mg/kg	1.1	NA	NA	7.6 U	2.3 U
Zinc	SW6010B	mg/kg	761	121	459	2190	561

Notes:

 Italic
 Value above the COSR Ecotox Threshold Value

 Bold
 Value above the COSR Ecotox Benchmark Value

Shaded Value above the COSR Ecotox Background and Threshold Value
Shaded Value above the COSR Ecotox Background and Benchmark Value

COSR Calumet Open Space Reserve
DDD Dichlorodiphenyldichloroethane
DDE Dichlorodiphenyldichloroethene
DDT Dichlorodiphenyltrichloroethane
J Estimated

mg/kg Milligrams per kilogram
NA Not available
ND Not detected

EPA U.S. Environmental Protection Agency

PCB Polychlorinated biphenyl

Table 2
Indian Ridge Marsh Sediment and Simultaneously Extracted Metals/Acid Volatile Sulfides (SEM/AVS) Sampling Results
April 2009

	L	aboratory ID :	C9D090311001		C9D090311002		C9D090311003		C9D090311004		C9D090311005		C9D090311006	
	Clie	nt Sample ID :	SD-01		SD-02		SD-03		SD-04		SD-05		SD-06	
	D	ate Collected :	4/8/2009		4/8/2009		4/8/2009		4/8/2009		4/8/2009		4/8/2009	
				SEM - AVS:		SEM - AVS:		SEM - AVS:		SEM - AVS:		SEM - AVS:		SEM - AVS:
Analyte	Test Method	Units												
Cadmium	SW6010B	μmole/g	0.023	-376.98	0.026	-226.97	0.0045	-51.50	0.0097	-87.89	0.0099	-99.09	0.015	-74.79
Copper	SW6010B	μmole/g	0.97 J	-376.03	1 J	-226.00	0.22 J	-51.28	0.62 J	-87.28	0.61 J	-98.49	0.71 J	-74.09
Lead	SW6010B	μmole/g	1.1	-375.90	1.4	-225.60	0.14	-51.36	0.34	-87.56	0.34	-98.76	0.64	-74.16
Mercury	SW7471A	μmole/g	0.00069 U	-377.00	0.00047 U	-227.00	0.00018 U	-51.50	0.00028 U	-87.90	0.00041 U	-99.10	0.00061 U	-74.80
Nickel	SW6010B	μmole/g	0.27	-376.73	0.25	-226.75	0.099	-51.40	0.32	-87.58	0.26	-98.84	0.21	-74.59
Zinc	SW6010B	μmole/g	12.4	-364.60	13.8	-213.20	2.6	-48.90	5.1	-82.80	6.0	-93.10	9.3	-65.50
Sum of Metals SEM		μmole/g	14.76	-362.24	16.48	-210.52	3.06	-48.44	6.39	-81.51	7.22	-91.88	10.88	-63.92
Acid Volatile Sulfide	AVS	μmole/g	377		227		51.5		87.9		99.1		74.8	
Solids, Percent	IN623	% weight	9.1		13.2		33.7		21.9		15.2		10.2	

	L	aboratory ID :	C9D110102001		C9D110102002		C9D110102003	C9D110102004	SD-09		C9D110102005		
	Clie	ent Sample ID :	SD-07		SD-08		SD-09	SD-09D	Average		SD-10		
	D	ate Collected :	4/9/2009		4/9/2009		4/9/2009				4/9/2009		Mean SEM-
				SEM - AVS:		SEM - AVS:				SEM - AVS:		SEM - AVS:	AVS
Analyte	Test Method	Units											
Cadmium	SW6010B	μmole/g	0.014	-212.99	0.035	-72.37	0.024	0.028	0.026	-51.97	0.00066 J	-6.70	-126.12
Copper	SW6010B	μmole/g	0.79 J	-212.21	1.4 J	-71.00	1 J	1.1 J	1.05	-50.95	0.025 U	-6.68	-125.40
Lead	SW6010B	μmole/g	0.61	-212.39	1.8	-70.60	1.4	1.7	1.55	-50.45	0.028	-6.67	-125.35
Mercury	SW7471A	μmole/g	0.00063 U	-213.00	0.00056 U	-72.40	0.00046 U	0.00046 U	0.00046 U	-52.00	0.000083 U	-6.70	-126.14
Nickel	SW6010B	μmole/g	0.27	-212.73	0.39	-72.01	0.34	0.36	0.35	-51.65	0.028	-6.67	-125.90
Zinc	SW6010B	μmole/g	8.6 J	-204.40	16.4 J	-56.00	9.8 J	10.6 J	10.2	-41.80	0.49 J	-6.21	-117.65
Sum of Metals SEM		μmole/g	10.28	-202.72	20.03	-52.37	12.56	13.78846	13.17646	-38.82	0.57	-6.13	-115.86
Acid Volatile Sulfide	AVS	μmole/g	213		72.4		50.6	53.4	52		6.7		•
Solids, Percent	IN623	% weight	9.9		11		13.6	13.6	13.6		74.7		•

Notes:

AVS Acid volatile sulfide J Estimated

SEM Simultaneously extracted metals

U Not detected

Table 3
Indian Ridge Marsh Surface Water Sampling Results
April 2009

	Labor	atory ID :				C9D090311007	C9D090311008	C9D090311009	C9D090311010	C9D090311011	C9D090311012
	Client Sa	mple ID :				SW-01	SW-02	SW-03	SW-04	SW-05	SW-06
	Date C	Collected :				4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009
				COSR Ecotox							
Analyte	Test Method	Units	Background	Threshold	Benchmark						
Antimony	SW6020	μg/L	<8	30	88	0.9 J	0.82 J	0.71 J	1.5 J	0.9 J	0.9 J
Arsenic	SW6020	μg/L	2.5	48	340	2.4	1.6	1.9	2.1	1.4	0.72 J
Barium	SW6020	μg/L	50	5000	5000	62.9	61.2	57.4	66.4	69.9	72.6
Beryllium	SW6020	μg/L	<4	NA	NA	1 U	1 U	1 U	0.076 J	1 U	1 U
Boron	SW6020	μg/L	NA	NA	NA	298	299	317	334	372	378
Cadmium	SW6020	μg/L	<2	5.1	14.3	1 U	1 U	1 U	1 U	1 U	1 U
Chromium	SW6020	μg/L	<8	NA	NA	4.9	5.5	5.3	5.1	4.5	5
Copper	SW6020	μg/L	5.1	23.2	36.4	2.7	1.8 U	1.6 U	2.6	1.5 U	1.4 U
Iron	SW6020	μg/L	710	1000	1000	2220	1970	1270	1810	1400	937
Lead	SW6020	μg/L	<2	16.7	318.2	8.2	7.1	3.3	5.4	3.9	4.9
Manganese	SW6020	μg/L	42	1000	1000	315	312	303	277	244	227
Mercury	SW6020	μg/L	0.017	0.9	1.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	SW6020	μg/L	<20	133.6	1202.8	4.4	3.8	3.8	4.9	4.1	3.8
Selenium	SW6020	μg/L	<2	5	10	1.4 U	1.1 U	1.2 U	1.7 U	1.4 U	1.2 U
Silver	SW6020	μg/L	<2	5	5	1 U	1 U	1 U	1 U	1 U	1 U
Thallium	SW6020	μg/L	<2	10	20	0.12 J	0.074 J	0.041 J	0.047 J	0.02 J	1
Zinc	SW6020	μg/L	12	303.9	301.4	22.4	19.6	9.5	13.9	8.2	11.4
Total Ammonia-Nitrogen	MCAWW 350.1	mg/L	NA			2.9 J	3.3 J	3.1 J	3.3 J	3.1 J	3.0 J
Un-ionized Ammonia ¹		mg/L	NA	0.025	0.14	0.4Ј	0.45J	0.46J	0.45	0.46J	0.41J
Hardness	SM20 2340c	mg/L	NA	NA	NA	408	400	456	400	396	352

Table 3 Indian Ridge Marsh Surface Water Sampling Results April 2009

	Labor	atory ID :				C9D090311007	C9D090311008	C9D090311009	C9D090311010	C9D090311011	C9D090311012
	Client Sa	ample ID :				SW-07	SW-08	SW-09	SW-09D	SW-09 Average	SW-10
	Date (Collected :				4/8/2009	4/8/2009	4/8/2009	4/8/2009	_	4/8/2009
			COSR	COSR Ecotox	COSR Ecotox						
Analyte	Test Method	Units	Background	Threshold	Benchmark						
Antimony	SW6020	μg/L	<8	30	88	0.92 J	0.74 J	1.1 J	1.1 J	1.1	1.6 J
Arsenic	SW6020	μg/L	2.5	48	340	1.3	1.4	1.7	0.91 J	1.305	1.3
Barium	SW6020	μg/L	50	5000	5000	81.1	55	34.7	33.7	34.2	75.4
Beryllium	SW6020	μg/L	<4	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
Boron	SW6020	μg/L	NA	NA	NA	423	52.7	50	45.7	47.85	446
Cadmium	SW6020	μg/L	<2	5.1	14.3	1 U	1 U	1 U	1 U	1 U	1 U
Chromium	SW6020	μg/L	<8	NA	NA	6.5	5.3	3.8	5.1	4.45	4.9
Copper	SW6020	μg/L	5.1	23.2	36.4	2.4 U	1.9 U	1.6 U	1.6 U	1.6 U	1.1 U
Iron	SW6020	μg/L	710	1000	1000	1480	954	558	569	563.5	384
Lead	SW6020	μg/L	<2	16.7	318.2	6.9	7	6.4	6.2	6.3	3
Manganese	SW6020	μg/L	42	1000	1000	291	97.4	131	128	129.5	175
Mercury	SW6020	μg/L	0.017	0.9	1.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	SW6020	μg/L	<2	133.6	1202.8	4.3	1.3	1.1	1.3	1.2	3.5
Selenium	SW6020	μg/L	<2	5	10	1.6 U	0.61 U	0.65 U	0.7 U	0.7 U	1.4 U
Silver	SW6020	μg/L	<2	5	5	1 U	1 U	1 U	1 U	1 U	1 U
Thallium	SW6020	μg/L	<2	10	20	0.02 J	1	0.14 J	0.092 J	0.116	0.046 J
Zinc	SW6020	μg/L	12	303.9	301.4	19.3	21.2	10.7	11.4	11.05	7

Total Ammonia-Nitrogen	MCAWW 350.1	mg/L	NA			4.5	0.6 U	0.6 U	0.85 J	0.85 J	3.4
Un-ionized Ammonia ¹		mg/L	NA	0.025	0.14	0.62	0.08U	0.08U	0.12	0.12	0.47
Hardness	SM20 2340c	mg/L	NA	NA	NA	350	122	128	126	127	340

Notes:

Un-ionized ammonia determined from total ammonia-nitrogen using the conversation equation in Illinois Water Quality Standards IAC Title 35 Section 302.535

Bold Value above the COSR Ecotox Threshold Value
Shaded Value above the COSR Ecotox Benchmark Value

 $\begin{array}{ll} mg/L & Milligrams\ per\ liter \\ \mu g/L & Micrograms\ per\ liter \end{array}$

COSR Calumet Open Space Reserve

J Estimated
NA Not available
U Not detected

Table 4 Indian Ridge Marsh Vegetation Sampling Results April 2009

Analyte	Test Method	Laboratory ID : Client Sample ID : Date Collected : Units	COSR Soil Background	Ecotox Soil	COSR Ecotox Soil Benchmark	5/14/2009	SB-9 ^a (3) ^b	Bioaccumulation Ratio	C9E160102002 VG-2 5/14/2009	SB-18 ^a (1) ^b	Bioaccumulation Ratio
Antimony	SW6020	mg/kg	4	0.30	65	0.030 J	NA	NA	0.015 J	NA	NA
Arsenic	SW6020	mg/kg	13	18	31	0.023 J	4.7	0.005	0.1 U	4.89	NA
Beryllium	SW6020	mg/kg	0.59	21	48	0.1 U	0.18	NA	0.1 U	0.34	NA
Cadmium	SW6020	mg/kg	0.60	0.40	3.37	0.031 J	ND	NA	0.1 U	1.01	NA
Chromium	SW6020	mg/kg	16.2	26	131	0.28 J	6.43	0.04	0.44 J	13.9	0.032
Copper	SW6020	mg/kg	19.6	54	190	1.2	9.49	0.13	2	60.6	0.033
Lead	SW6020	mg/kg	36	16	430	0.36	11	0.03	0.15	425	0.00035
Mercury	SW7471A	mg/kg	0.06	0.07	1.3	0.033U	1.85	NA	0.033 U	0.478	NA
Nickel	SW6020	mg/kg	18	44	210	0.11	7.05	0.02	0.17	20.5	0.0083
Selenium	SW6020	mg/kg	0.48	0.80	1	0.066 J	ND	NA	0.062 J	ND	NA
Silver	SW6020	mg/kg	0.55	0.40	2	0.0038 J	ND	NA	0.1 U	0.512	NA
Thallium	SW6020	mg/kg	0.32	0.86	1.3	0.1 U	ND	NA	0.1 U	ND	NA
Zinc	SW6020	mg/kg	95	113	250	11.7	6.17	1.90	9.5	256	0.037

		Laboratory ID :				C9E160102003			C9E160102004			Average
		Client Sample ID : Date Collected :				VG-3 5/14/2009	SB-27 ^a (1)	Bioaccumulation Ratio	VG-4 5/14/2009	SB-52 ^a (2) ^b		Bioaccumulation Ratio
Analyte	Test Method	Units	COSR Soil Background	Ecotox Soil	COSR Ecotox Soil Benchmark							
Antimony	SW6020	mg/kg	4	0.30	65	0.0097 J	NA	NA	0.0084 J	NA	NA	NA
Arsenic	SW6020	mg/kg	13	18	31	0.023 J	3.18	0.0072	0.1 U	ND	NA	0.006
Beryllium	SW6020	mg/kg	0.59	21	48	0.1 U	0.55	NA	0.1 U	0.128	NA	NA
Cadmium	SW6020	mg/kg	0.60	0.40	3.37	0.1 U	ND	NA	0.015 J	ND	NA	NA
Chromium	SW6020	mg/kg	16.2	26	131	0.27 J	16	0.017	0.32 J	10.2	0.031	0.031
Copper	SW6020	mg/kg	19.6	54	190	1.6	10.4	0.15	1.8	19.1	0.085	0.100
Lead	SW6020	mg/kg	36	16	430	0.1	7.64	0.013	0.23	19.1	0.057	0.026
Mercury	SW7471A	mg/kg	0.06	0.07	1.3	0.033 U	0.264	NA	0.033 U	0.212	NA	NA
Nickel	SW6020	mg/kg	18	44	210	0.19	19.8	0.010	0.18	10.5	0.053	0.022
Selenium	SW6020	mg/kg	0.48	0.80	1	0.081 J	ND	NA	0.5 U	ND	NA	NA
Silver	SW6020	mg/kg	0.55	0.40	2	0.1 U	ND	NA	0.1 U	ND	NA	NA
Thallium	SW6020	mg/kg	0.32	0.86	1.3	0.1 U	ND	NA	0.1 U	ND	NA	NA
Zinc	SW6020	mg/kg	95	113	250	5.8	31.7	0.18	7.5	69	0.02	0.535

Notes:

B Method blank had these analytes detected at concentrations between the method detection limit and reporting limit.

COSR Calumet Open Space Reserve mg/kg Milligrams per kilogram

J Estimated
NA Not available
ND Not detected

Bold Value above COSR Ecotox threshold
Shaded Value above COSR Ecotox benchmark

^a Sample location

^b Sample depth in feet below ground surface